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RAILWAY
LOCOMOTIVES AND CARS
JULY 1960

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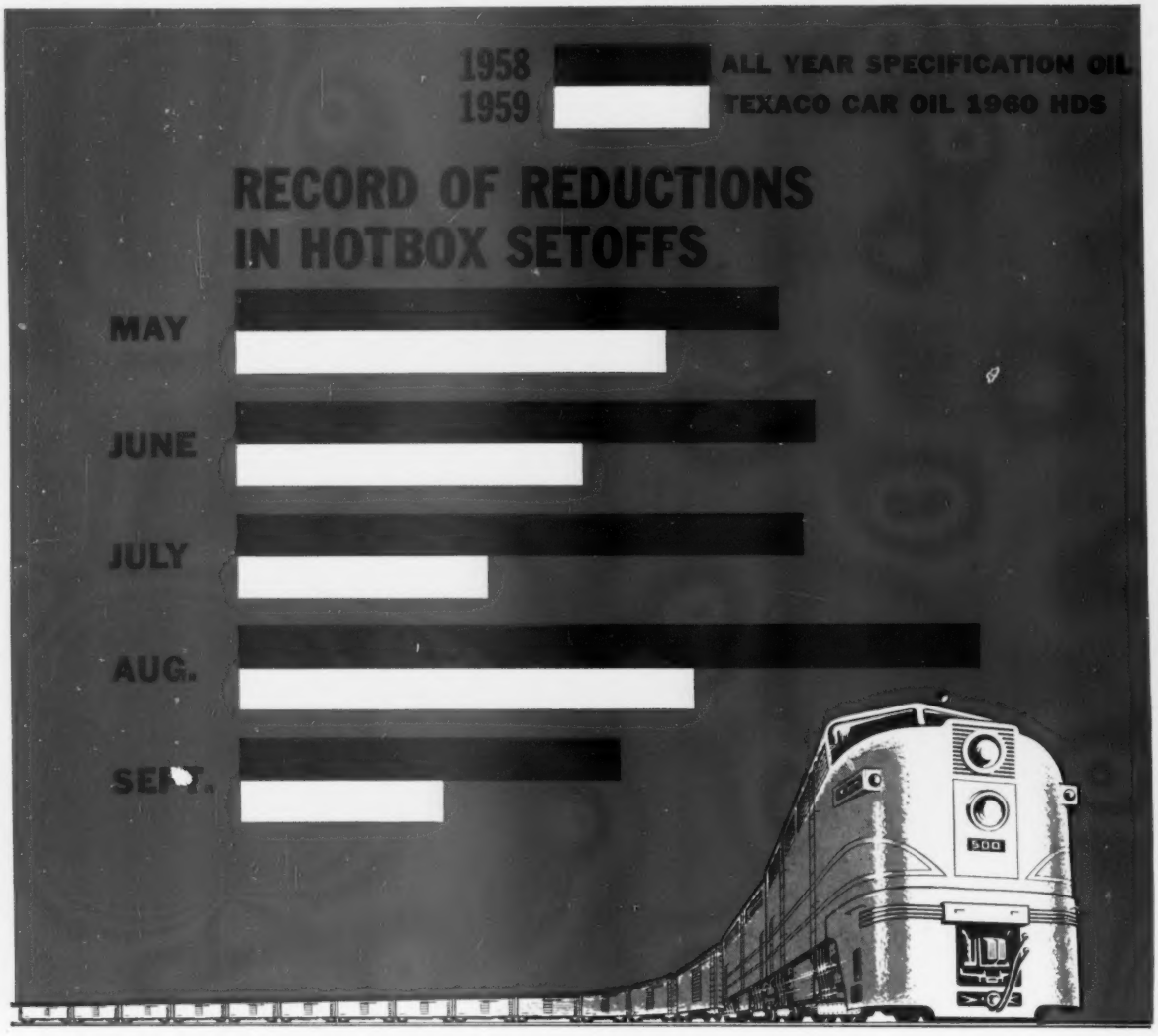
J. W. Hawthorne, AAR Mechanical Division Chairman ... page 19



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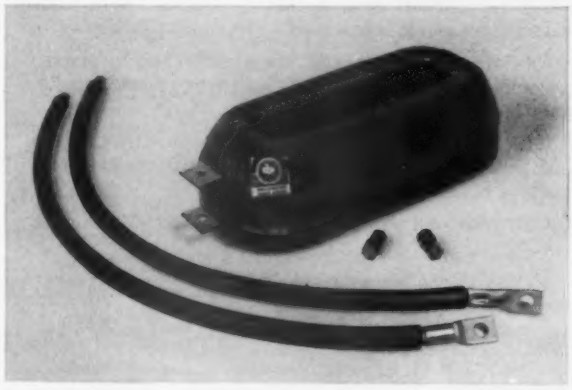

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America's Oldest Trade Paper

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REPORT FOR JULY

Brake Inspection Relief Again Denied

Relief from the 500-mile brake-inspection rule (RL&C, Sept. 1959, p. 5) has been denied again to five western railroads. The ICC has affirmed its Division 3's ruling which held that the roads had not shown that safety would be improved by the proposed modifications. The roads are the Santa Fe, GN, NP, SP and UP. They wanted relief to make inspections at points ranging from 502 miles to 577 miles apart.

New International Railway Journal

Selecciones del Railway Age, Simmons-Boardman Publishing Corporation's quarterly Spanish-language magazine is being expanded into a monthly, world-wide magazine. The new magazine will be called International Railway Journal. It will be edited and published in The Netherlands. Robert G. Lewis, publisher of Selecciones del Railway Age, will also be publisher of the new world-wide publication. David W. Beadle, who will be editor, comes to International Railway Journal from the public relations department of the New York Central.

Regular publication will begin with the January 1961 issue. A pilot issue is scheduled for October. Basic text of the new magazine will be English; summaries will be provided in Spanish, French and German. The magazine will be circulated among approximately 12,000 railway officers outside the U.S. and Canada.

CNR Drum Type Spark Arrester

To control sparks from exhaust stacks of diesel yard and road switcher locomotives, the mechanical department of the Canadian National has developed a drum which imparts a cyclonic action in circular motion to the exhaust gases. The drum is of ⅛-in welded plate and is applied externally to the exhaust stacks of switchers. Because of low clearance, road passenger and freight units are being equipped with a manufacturer's design.

With the advent of the diesel, it was hoped the spark problem would be eliminated, but this has not been the case. The CNR first tried observing, from the cupola of a caboose, sparks being emitted during long runs, but equally good results were realized by making observations within terminal limits at night.

Tests on road units with over 100,000 miles indicated that exhaust manifolds, manifold legs and exhaust stacks were comparatively clear of carbon accumulation. Carbon deposits, however, became heavier and softer on surfaces nearer the initial exhaust outlet from the cylinder. This discovery determined the source of trouble.

Several improvements were tried. First, wire mesh was bolted to the exhaust stack, but the accumulation of hard carbon on it resulted in an increase in back pressure. Then the principle of cyclonic action was developed, centrifugal force separating from the exhaust gases the heavy carbon particles which rotated until they burned out and disintegrated. This method was restricted to road passenger and road freight

(Continued on page 8)

TIME SAVING IDEAS FOR JULY

MOTIVE POWER AND CAR

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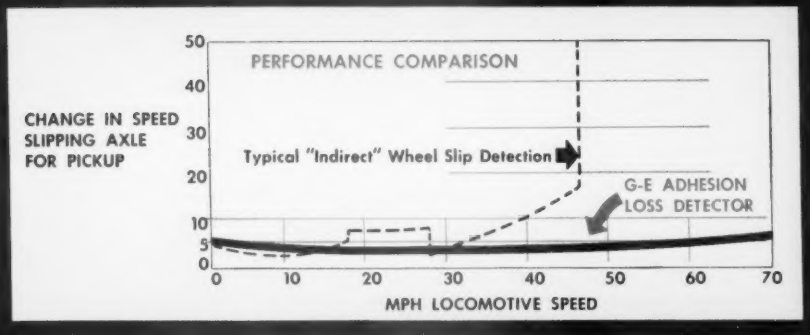

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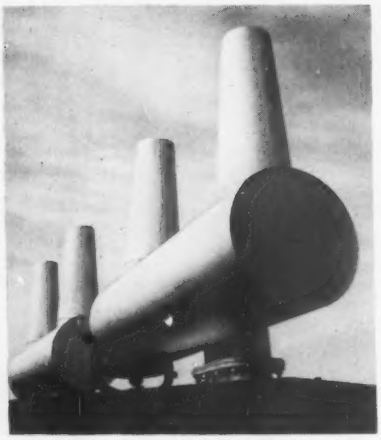


Drum spark arresters are applied to yard and road switchers in regional locomotive shops of the Canadian National. The device was designed by the road's mechanical department.

units, however, because of labor costs in the reworking of exhaust manifolds for its application and clearance difficulties.

Further study resulted in the devolpment of the drum spark arrester based on the same centrifugal principle. Additional tests showed the design to be more effective, and cost per unit was reduced from over $1,000 to around $200.

The drum spark arresters are built in CNR regional locomotive shops and are being applied to yard and road switchers as follows:

General Motors. A single drum, 15¼ in. diameter and 48 in. long, per exhaust stack.

Canadian Locomotive. Original exhaust snubbers, modified with the removal of all baffles, plates and stack extensions, to provide the required circular motion. This was accomplished by the introduction of two directional vanes placed vertically and immediately at the entrance to the snubber.

Montreal Locomotive Works (Alco). Two drums, side by side, with a single inlet neck of turbo opening size, bolted directly to the exhaust of the turbosupercharge.

U.S. Railroaders Visit Moscow

A 10-man U.S. railroad technical mission to the USSR, the first of an industrial exchange program arranged by the State Department last November, has been in Russia inspecting rail centers in Kiev, Kharkov, Rostov, Baku, Stalingrad, Kursk, and Leningrad. The group, headed by Curtis D. Buford, vice-president, Operations and Maintenance Department, AAR includes William M. Keller, AAR vice-president—research; John F. Nash, NYC vice-president—operations; Paul V. Garin, manager of research and development, SP; Sergei G. Guins, assistant to the research director, C&O; John W. Horine, electrical engineer, PRR; Frank E. Woolford, chief engineer, WP; Lowell B. Yarbrough, superintendent of signals and communications, Wabash, and two State Department interpreters.

A group of Russian railroaders are expected to come to the U.S. this month.

(Turn to page 54)

Orders and Inquiries for New Equipment

Placed Since the Closing of the June Issue

Diesel-Electric Locomotive Orders

Road and builder	*No. and Horsepower*	*Service*	*Detail*
TEXAS & PACIFIC: (Builder not named)	5 1,800	Road switchers	GP-18.
UNION PACIFIC: Electro-Motive	30 2,000	Road switchers	GP-20. Cost, over $6,000,000. For July and August delivery.

Freight-Car Orders

Road and builder	*No. of cars*	*Type of car*	*Detail*
CHESAPEAKE & OHIO: Company shops	200	Box	350 cars to be built in company shops to be 70 ton, 50½ ft, with special loading devices. Delivery of insulated box to begin in mid-September; regular box cars, in November.
	150	Insulated box	
General American	25	Covered hopper	Base unit cost, $13,200. For third quarter delivery.
CHICAGO & EASTERN ILLINOIS: Pullman-Standard	33	Box	50-ton, DF. For third quarter delivery.
E. I. DU PONT DE NEMOURS: General American	100	Covered hoppers	70-ton.
ROCK ISLAND: American Car & Fdry.	300	Box	40½ ft. 550 box cars in these orders to cost more than $5,000,000. Deliveries to begin in September.
	250	Box	50½ ft.
TRAILER TRAIN CO.: American Car & Fdry.	250	Piggyback flat	500 cars in these orders to be 85-ft and cost approx. $7,550,000. For June and July delivery.
Bethlehem Steel	100	Piggyback flat	
Pullman-Standard	150	Piggyback flat	
UNION TANK CAR: Company shops	55	Tank	"Hot Dog" design. 15 type 105A; 26 type 111A; 12 type 112A, and 2 type 204W.

Passenger-Car Orders

Road and builder	*No. of Cars*	*Type of car*	*Detail*
MILWAUKEE: Budd Co.	8	Suburban coaches	Double-deck cab control.
	32	Suburban coaches	Double-deck trailer type. 40 cars in order to feature electric air conditioning and heating, with power provided by generators installed on suburban diesel locomotives. Deliveries to begin within 10 to 12 months and be completed within an additional three-months' period. First step in modernization program which will eventually include purchase of 75 double-deck cars to replace all conventional suburban coaches now in service.

Notes and Inquiries

Toronto Transit Commission inquiring for 40 to 50 rapid transit cars (20 to 25 two-unit cars).

Milwaukee will, in the near future, place orders for 40 double-deck suburban coaches costing about $7,000,000. Eventually, the road will place 75 double-deckers in service, at a total cost of approximately $13,125,000.

Western Pacific directors have authorized purchase of 24 50-ft double-door box cars equipped with damage prevention loading devices. Estimated cost, $375,000.

Personal Mention

Chesapeake & Ohio. — *Richmond Va.:* K. T. REED appointed assistant chief mechanical officer. Formerly assistant regional manager at Huntington, W. Va. *Russell, Ky.:* R. G. BIAS appointed general car shop foreman, succeeding E. I. ELLIS, retired.

Denver & Rio Grande Western. — *Denver, Col.:* JOHN J. MARTIN appointed fuels and lubricants engineer.

Elgin, Joliet & Eastern.—*Joliet, Ind.:* THOMAS G. BOURNE appointed division general car foreman, succeeding CHARLES H. COOK. HERBERT D. BRANT appointed car foreman. FRED C. PIERCE, JR., appointed erecting foreman, light repairs. CLYDE M. YAHNKE appointed diesel shop foreman—nights, succeeding Mr. Pierce. *Gary, Ind.:* VINCENT R. NELSON appointed enginehouse foreman, Kirk yard, succeeding Mr. Yahnke. ARTHUR S. KIPPER appointed relief enginehouse foreman, succeeding Mr. Nelson. VIRGIL V. BROWN appointed general car foreman, succeeding EDWARD C. HEDLUND, resigned. CHARLES H. COOK appointed division general car foreman.

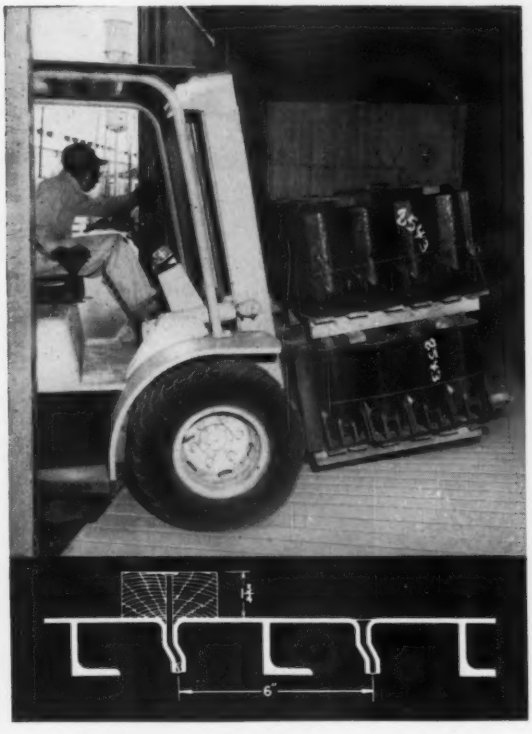
Missouri Pacific.—*Kansas City, Mo.:* H. R. BURGE appointed road master mechanic, Kansas and Central divisions. *Palestine,*

(Continued on page 51)

FOR THE 1,840TH TIME

FRISCO specifies

P-S Nailable Steel Floors



When the St. Louis-San Francisco Railway recently placed an order for 400 additional box cars they wanted the best . . . and got it . . . 400 Pullman-Standard PS-1 Box Cars equipped with roller bearings, combination plug and sliding doors, lading strap anchors and P-S Nailable Steel Flooring. This was their 5th order for P-S Nailable Steel Flooring bringing their total number of cars so equipped to 1,840 . . . convincing proof of the Frisco's complete satisfaction!

Husky P-S Nailable Steel Floors are made of narrow planks of high-strength steel laid laterally across the car. Each plank is joined to the next by welding in seven spots top and bottom. Interlocked joints at the welds absorb all loads and reduce shear forces. In addition, each plank is further reinforced by a support angle attached by a continuous automatic submerged arc-weld. The result is an extra strong floor capable of taking the concentrated wheel loads of lift trucks and the in-transit vertical impacts of heavy palletized loads and machinery . . . tight enough for fine bulk loads of all kinds.

P-S Nailable Steel Floors provide 79 nailing grooves in a 40′ 6″ car, 99 nailing grooves in a 50′ 6″ car for conventional bulkheading and blocking. This strong smooth floor will stay in Class A condition keeping the car in revenue service thus reducing car maintenance expense and claims for lading loss and damage.

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BIRMINGHAM, PITTSBURGH, NEW YORK
J. C. Fennelly Company, San Francisco Representative

Plastic Car Door Liners

Door liners for latest PFE refrigerator cars embody the largest individual moldings ever made of plastics developed by the Koppers Co. and the Borg-Warner Corp. Use of these plastics, it is said, improves insulation and results in savings of from 400 to 500 lb in car door weight. The doors are 9 ft 3 in x 8 ft 6 in. x 8-5/16 in. thick. Inside each an 89-lb molding of Dylite expandable polystyrene from Koppers forms a tight, moisture-proof, non-sagging insulation. The door liners are of tough Cycolac plastic made by the Marbon Division of Borg-Warner. They are said to be the largest plastic pieces ever made by vacuum forming. Special, custom-built machines are required to mold both the Koppers and Marbon plastics.

The developer and builder of the door liners is Robert L. Landis, San Jose, Calif. They are being produced by the *Landis Industrial Co., Dept. RLC, Santa Clara, Cal.*

Pressure Type Cleaning Gun

A high-velocity-spray, pressure-type cleaning gun will deliver a driving spray to knock off dirt and provide coarse, hard-hitting drops to penetrate built-up films. It is adjustable, however, for a full range down to a gentle mist. The extension nozzle permits spraying into cavities and other hard-to-reach areas, and an adjustment on the gun permits a quick change of the amount of material being sprayed. The gun can be used with all common cleaning and degreasing materials.

The nozzle and extension tube are of brass and the gun body of aluminum. Use of a De-Vilbiss air transformer or pressure regulator is recommended to provide the 6.5 cfm at 60 psi required for the gun. *De-Vilbiss Co., Dept. RLC, Toledo 1, Ohio.*

Car-Journal Lubrication Pump

A car-journal lubrication pump with a special air eliminator piston has multiple ratio settings of 2:1, 4:1, and 7:1 to handle all lubricant viscosities. It is manually operated and is equipped with a 32-oz lubricant meter, 5 ft of lubricant hose, and swivel type nozzle. The nozzle features both a ⅜-in. male pipe thread connection and a ½- x ⅜-in. female adapter. The container holds 30 lb. A special drum cover keeps lubricants clean.

To operate the unit, the plug assembly is removed from journal box and the lubricator nozzle attached to journal opening. *Aro Equipment Corp., Lubricating Equipment Div., Dept. RLC, Bryan, Ohio.*

General Purpose Filter Assembly

The Series 3100 general purpose filter assemblies for use in the filtration of most fuels, lubrication oils, hydraulic fluids, air and other gases and liquids, have pore size ratings from 2 to 100 microns. The five different element materials with which they are available include woven wire cloth, sintered bronze, pleated resin-impregnated cellulose sheet, stacked resin-impregnated cellulose washers, and helically wound resin impregnated cellulose ribbons. The overall temperature range covered by these elements is minus 350 F to plus 350 F. Flow rate and pressure drop ratings are dependent on filter element materials and fluids to be filtered.

The filter assemblies have a rated operating pressure of 150 psi with a burst pressure of 600 psi. The housings are fabricated from aluminum and are blue anodized. *Bendix Filter Div., Bendix Corp., Dept. RLC, 434 W. 12 Mile Road, Madison Heights, Mich.*

Sonic Energy Cleaning

Rework is said to be eliminated and three times as many pieces released from production each hour through the use of Bendix sonic energy equipment for the cleaning of rotary electrical equipment. Additional savings of over 87 per cent are said to be realized on cleaning solution costs by using Bendix 25-1, a water detergent, instead of naphtha. *Bendix Aviation Corp., Pioneer-Central Div., Dept. RLC, Davenport, Iowa.*

(Turn to page 48)

1st choice in the *Ryder System MODEL SHOP

*Ryder System of Miami, Fla. is made up of a large motor common carrier operation and a vast national rental and leasing network. It owns close to 25,000 vehicles. The Miami Model Shop is the first experimental model shop of its kind in the country. It is designed and engineered to test new equipment and techniques to achieve maximum results with a minimum of lost motion.

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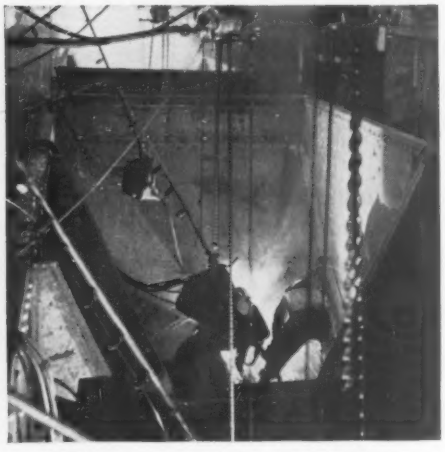

Bethlehem uses semi-automatic, inert-gas consumable electrode welding to assure full penetration of welded floor seams.

This hopper car, now in production at our Johnstown Car Shops for the PRR, was designed by a committee of engineers drawn from three railroads which own nearly one-third of all the nation's hopper cars. The committee's objective: to incorporate the advantages of standardization, modern production techniques, and an anticipated service life of at least 18 years.

The car has been formally adopted by the AAR as an Alternate Standard. The Pennsylvania's order for 4,000 is nearing completion, and we will soon be building this same car for the Western Maryland and the Denver & Rio Grande Western. Several other coal-hauling roads have exhibited lively interest in it.

Car standardization is being hailed by railroads as a big step forward in the reduction of construction and maintenance costs. Bethlehem is completely tooled up to produce this hopper car with utmost efficiency and economy. We will welcome your inquiry; just contact our nearest sales office.

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EDITORIALS

Railroading Still Has Its 'Sacred Cows'

Several hundred thousand freight cars should be scrapped. About two-thirds of the car-days are wasted. These statements, made by D. W. Brosnan, vice-president-operations, Southern, before the AAR Mechanical Division annual meeting on June 15 are both an appraisal and an indictment of the railroad industry.

Mr. Brosnan "pulled no punches" in discussing the per diem rate and its effect on car ownership and car utilization. "No other items in the railroad business," he said, "offer the same opportunities for cost saving and service." He said those who want to keep the $2.88 per diem rate are the owners of broken-down equipment.

We do not exactly know how the railroads determined that a freight car is worth $2.88 per day, but we can agree with Mr. Brosnan that it "doesn't make sense" that freight cars 25 years of age and older should rate the same rental as new high-capacity cars tailored to meet today's traffic requirements. He suggested per diem should take into account the cost, capacity, age and condition of a car.

A variable per diem rate would undoubtedly complicate the bookkeeping, but some means for making the rate compensatory should be found. The rate should be an incentive, not a deterrent, to the building of freight cars that Mr. Brosnan referred to as "having the capacity to produce earnings for the railroads and service for the shippers."

In discussing car utilization, Mr. Brosnan said that an analysis made on the Southern showed about two-thirds of freight-car days are non-productive or wasted. If we could cut this waste in two, he said, we could reduce car ownership by one-half, or by eight or nine hundred thousand cars.

To reduce this waste requires the cooperation of the shipper and consignee in loading and unloading operations. The mechanical department's contribution, Mr. Brosnan indicated, would be in designing high-capacity cars with more favorable payload-to-light-weight ratios.

Saving weight is not a new objective of the car designer. But possibly a new approach to weight savings could be made by more attention to the use of shape to obtain strength, as Mr. Brosnan suggested. There is too much metal in cars, he said, and every time we take weight out we reduce costs and increase payload.

These matters of car ownership and car utilization are not the primary responsibility of the mechanical department. They are so important to the future of the railroad industry, however, that they are the concern of all employees. They were labelled "sacred cows" by Mr. Brosnan and, as he put it, "sacred cows are accustomed to comfortable stalls."

There is no place for "sacred cows" in any progressive industry.

New Interest in Locomotive Development

The diesel-hydraulic and the coal-burning gas-turbine locomotives have sparked renewed interest in locomotive development. Additional information on these new locomotive types, to be introduced to U.S. railroads early next year, was presented to the recent AAR Mechanical Division annual meeting at San Francisco.

The Southern Pacific announced its plans for testing the three 4,000-hp diesel-hydraulic Krauss-Maffei locomotives that it has ordered. The Union Pacific released details on the coal-burning gas-turbine locomotive that it is building in its Omaha shops.

The SP intends to test the diesel-hydraulic units both in high-speed heavy-duty freight service and in slower-speed mountain service. With a 98,000-lb starting drawbar tractive effort and 33 per cent adhesion, these units should be particularly suited to railroads operating through territory where heavy grades are encountered.

The Committee on Locomotives, in discussing these locomotives, reported on the advantages and disadvantages of the hydraulic drive. There are disadvantages, to be sure, but it must be kept in mind that this design is not experimental; it has been used successfully in more than two hundred units in Europe. The question that must be answered here is whether this design can meet the more rugged demands that our operating conditions require of motive power without excessive maintenance.

Unlike the diesel-hydraulic, the coal-burning gas-turbine has no record of service, foreign or domestic, behind it. For this reason, a great deal of credit is due the Union Pacific for investing both money and technical know-how in building and testing this new motive power. It is using for the new locomotive the gas turbine presently used in the UP's 4,500-hp oil-burning gas-turbine locomotives. The UP is converting a diesel-electric passenger locomotive as a lead unit for the coal-burning gas-turbine B unit.

What the coal-burning gas-turbine locomotive can do is a question mark. It can be made to operate, but there are both technical and economic questions about its position in the motive-power field that only test investigations, such as those the UP is making, can answer.

After many years of diesel-electric dominance in motive-power development, it is a refreshing turn of events that introduces two new locomotive designs. These new types may or may not turn out to be economically sound. But they do give motive-power development the "shot in the arm" that has been missed these past several years.

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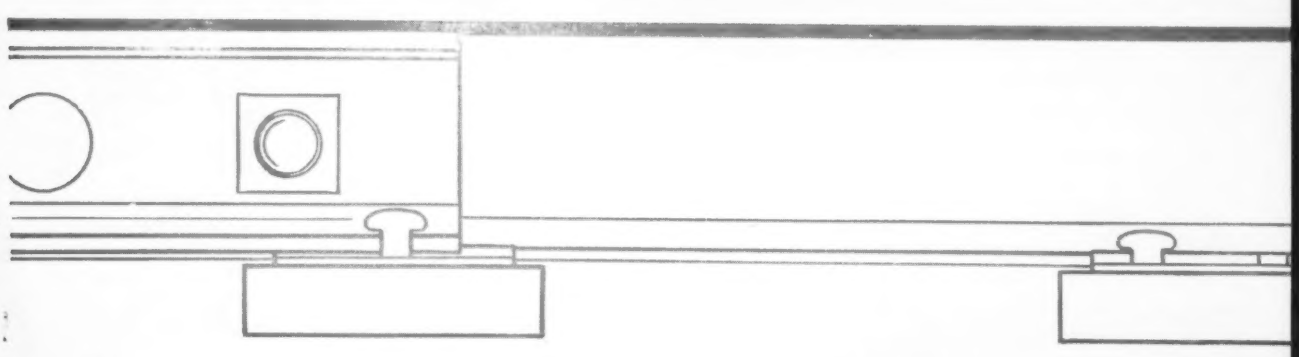

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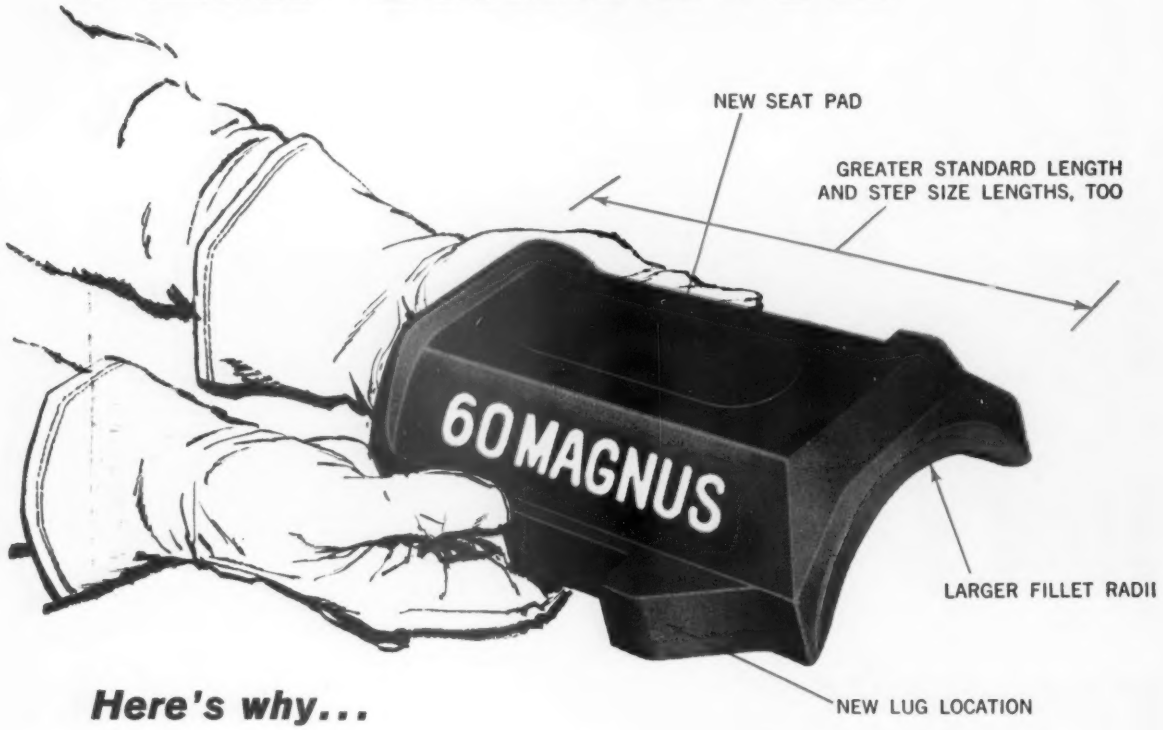

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New Motive Power, Cars in Prospect

Equipment developments overshadow perennial hot box at AAR Mechanical Division meeting

Prospects of new motive power developments and interest in new car designs overshadowed problems associated with the solid-bearing journal assembly at the 1960 meeting of the AAR Mechanical Division in San Francisco. While still a major problem, discussions indicated that mechanical officers feel technical developments of the past few years have given them ways for overcoming the hot box. Lack of cash and inadequate financial incentives—not lack of technological development — apparently prevent faster improvement in journal bearing performance.

Taking the place of the hot box, prime topic at most recent annual meetings, was the subject of possible changes in the U.S. motive power picture. For the first time, details of two new locomotive designs were made public. D. J. Russell, president of the Southern Pacific, told of the six 4,000-hp diesel-hydraulic road freight locomotives which are expected to be in service in the U.S. by early 1961. These locomotives, ordered from West Germany's Krauss-Maffei, will be 144-ton A units. Three will be delivered to the Denver & Rio Grande Western and three to the Southern Pacific (RL&C, March 1960, page 24, and June 1960, page 35).

The Locomotive Committee reported on the coal-fired gas-turbine locomotive which the Union Pacific has under construction at its Omaha, Neb., shop. When completed early next year, the three-unit machine will consist of a 2,000-hp A-unit passenger diesel, a 4,500-hp coal-fired gas-turbine B unit, and a tender to carry and prepare coal (see page 20).

H. M. Wood, chairman of the Arbitration Committee, told how the original Jan. 1, 1960, date for elimination of loose waste packing from all journal boxes was extended to Jan. 1, 1961. It is now the intention to hold this date, and interchange rules are being altered toward this end. Lubricators must be applied to all cars when repacked after August 1, 1960, with only a few exceptions. The application of waste to boxes after Aug. 1 will be considered temporary repairs for which a car owner cannot be billed. It will also be possible to reject waste-packed cars offered in interchange, but it is not the intention of the Division that this be done with loads.

S. M. Houston, general mechanical superintendent of the SP and chairman of the Mechanical Division, said that recently efforts of the Division had been centered on

- Improved braking methods.
- Evaluation of lubricators in replacement of loose journal packing.
- Revision of AAR loading rules in loose-leaf form.
- Establishment of standards and interchange agreements for piggyback.
- Simplification of AAR billing procedures.
- Application of steel wheels to all freight equipment.

Mr. Houston said the Division should develop minimum necessary working rules for safe operation of rolling stock which could serve as the basis for a needed revision of 1911 rules that are the basis for today's ICC equipment regulation. He said that cooperation between the Division and the ICC have been excellent, but that regulations based on 1911 steam locomotives are unrealistic for today's type of operations.

D. J. Russell, SP president, addressing the group on June 14, said today's railroads require "fourth-dimension-

D. J. Russell, SP president, calls for more "fourth dimensional" thinking.

J. W. Hawthorne (left), ACL chief mechanical officer, succeeds S. M. Houston as Mechanical Division chairman.

D. W. Brosnan, Southern vice president, seeks elimination of "sacred cows."

Exhibits of Railway Mechanical and Electrical Supply Association proved popular. Registration for Mechanical Division and Electrical Section meetings totalled almost 1,900.

al" thinking on the part of departmental managers. This, Mr. Russell said, is "thinking that embraces a broader knowledge of the objectives and problems of the traffic people, the transportation people, the engineering people, and many others so you can most effectively gear your work with theirs to the ultimate ends of attracting more business and building net profits.

"Use of cheaper fuels is an example of how the broader outlook must go beyond departmental lines. Viewed purely from a mechanical department standpoint, lower grade fuels have increased locomotive maintenance costs some $600,000 a year. But viewed in terms of the welfare of our company, these cheaper fuels are saving $2,600,000 in annual fuel costs. Even with the increased maintenance expense, there is a net annual saving of $2,000,000."

On June 15, D. W. Brosnan, vice president-operations of the Southern, said that "there could never be a more discouraging approach to car rental than the present uniform per diem system." The $2.88 daily rental for all types and ages of freight cars is a "tremendous brake" on efforts to provide proper equipment. The present system makes railroads keep out-of-date cars in service to recoup losses sustained by having modern, high-capacity cars earn only $2.88 daily, a figure which will not cover ownership costs.

Traditional per diem and conventional ways of utilizing freight cars were termed "sacred cows" by Mr. Brosnan. He said all-out efforts should be exerted to get more equitable compensation and greater use of the U.S. car fleet.

Dr. G. Wiens, head of the mechanical and equipment departments of the German Federal Railroad, told on June 16 how the GFR is using diesel-hydraulic locomotives. All German diesels have this drive. Low cost, light weight and small size all had roles in its selection as the standard. There are over 700 small diesel-hydraulic units and 86 with ratings of more than 2,000 hp. Further expansion of this fleet is under way at present. As early as 1948, the GFR made the decision to acquire nothing but diesel hydraulics. Heavy-traffic lines are being electrified. "These hydraulic transmissions have a record of robust design, simplicity of control and low maintenance," Dr. Wiens said. "They provide effective protection against slipping of driving wheels."

UP Building Coal-Burning Gas Turbine

The UP is constructing in its Omaha shops an experimental coal-fired gas-turbine-electric unit and tender which will operate with a modified diesel-electric lead unit, the Committee on Locomotives reported. One of the 4,870-hp gas turbines presently used in the 4,500-hp gas turbines will be used with the same type of reduction gear box, four main generators, and eight traction motors used on the 4,500-hp units.

The lead unit is a modified Alco 2,000-hp passenger diesel with freight gearing. By removing the steam generator and water tanks, about 4,000 gal fuel oil will be carried. The diesel fuel will be used for firing the trailing gas-turbine unit before transfer to coal fuel. In the event of failure of the coal-handling equipment, the gas turbine can run at full load as an oil-turning machine. The present Alco control stand will be replaced with a 20-notch turbine controller modified for multiple-unit operation.

The B unit will be the gas-turbine-electric unit, using the car body and running gear of a retired Great Northern straight electric (RL&C, December 1959, p. 8). Eight of the 12 axles will be powered with the same motor control and dynamic brake equipment as used on the 4,500 GTE's.

At the back end of the B unit, a 500-kw alternator driven by an 8-cylinder 567CR diesel will supply power for the coal-processing equipment in the tender. The converted steam tender will have a capacity of 54 tons of 1- by 2-in. coal. Two thousand gallons of emergency diesel fuel will also be carried in the tender bed either for the auxiliary diesel engine or the gas turbine.

Coal will be moved to the processing equipment at the front end of the tender by a Redler conveyor. From the conveyor, the coal will discharge into a ⅛ x 0 crusher, then conveyed by air to 4-ton capacity fluidized storage bins (RL&C, Sept. 1957, p. 37). The bins feed by gravity into two LDC (Locomotive Development Committee) coal pumps. Primary air from the turbine compressor, which has its pressure increased by a booster compressor in the tender, feeds through each coal pump to convey crushed coal to the pressurized pulverizers. The mixture of finely pulverized coal and air then flows to burners in each combustor in the B unit. Combustion and coal-handling equipment is being designed for future use of a 7,000-hp turbine.

Oil-Fired Turbines

The Union Pacific has equipped 19 of its original 25 4,500-hp gas-turbine-electric locomotives with multiple-unit controls for operation with trailing diesel units. The remaining six will be equipped this year. In 1959, the 25 turbine locomotives produced 13.2 per cent of the freight gross ton-miles on the UP and averaged 9,419 miles per month. By the end of 1959, locomotive 52, the second GTE placed in service, had accumulated 827,682 miles since going into service in 1952.

Seven of the 4870 hp gas turbines were shopped during the year because of high vibration or bearing fatigue failures. Only one serious failure occurred. That was a fracture of first stage buckets having only 7,518 hrs service. Tests will soon be made by the manufacturer to increase life of turbine buckets by coating them with tungsten. Life of first stage buckets through the years has shown a gradual decline. Tests of stellite coated first stage shroud segments show promise. To reduce bearing failures, the

manufacturer now balances all rotating components. Aluminum bearings will be tested in the near future. No failures of compressor rotor and stator blades occurred during the year.

At the end of 1959, the average service was 3,916 turbine hours per removal over the last eight years. Eleven of the 8,500-hp gas turbines were in service last year. All but two are now equipped with high speed transition (RL&C, March 1959, p. 44). The units averaged 11,911 miles per month in 1959. Locomotive 1 has accumulated 181,928 miles since entering service August 31, 1958.

Hydraulic Transmissions

Development of 1500 and 2000-hp hydraulic units is reported by the Committee as being the most important advancement in the field of hydraulic transmissions for locomotives since the 1956 report. Six 4000 hp units are to be completed next year for the SP and D&RGW (RL&C, June 1960, p. 35). While the Committee has very little information on maintenance cost as compared to diesel-electrics, it reports several definite advantages and disadvantages that have shown up so far in the development of the hydraulic transmission. Claims for the hydraulic transmission include:

- Efficiency close to diesel-electrics.
- Prevention of heat build-up by continually circulating the transmission of oil through radiators, which does not impose as stringent a short-time rating at low speeds as is now the case for diesel-electrics.
- Greater adhesion, due to all driving axles on each truck being mechanically geared together to eliminate individual wheel slip. This makes possible lighter wheel loading, and in turn, requires less weight per locomotive horsepower, leaving more tractive effort to pull trains up grades.
- Horsepower per axle is limited on diesel-electrics by the size of the traction motor that can be mounted between the wheels. With the hydraulic transmission, there is room for a gear box on each axle that will handle greater horsepower than the upper limits of weight and adhesion can handle.

Disadvantages for this type of power transmission include:

- Slight differences in wheel diameters when geared together could set up resonant frequencies in the driving mechanism, although, according to reports from Germany, this has not proved to be a serious problem.
- Separate torque converters with heat exchangers are needed to absorb energy for dynamic braking.
- High torque transmission needed at low train speeds is attained by high diesel engine speeds. This necessitates several gear changes, or the equivalent, to retain a relatively high torque transmission over a wide range of train speeds.
- Due to maintenance methods and demands for heavy tonnage per horsepower, a factor which might prove disadvantageous in the United States is the necesity of maintaining very close tolerances in all parts of the mechanical transmission in order to transmit maximum horsepower for long periods of time without excessive wear.

The Committee reports pleated paper fuel filter elements have a much greater life with similar efficiency or degree of filtration as compared to cotton sock elements. Initially determined by AAR laboratory tests with Arizona road dust, six field tests conducted in a wayside fuel filter housing through which 25,000 gal of fuel were pumped daily have confirmed the findings.

The Committee on Locomotives has recommended a procedure for storage of diesel-electric locomotives as a letter ballot item. It covers short and long term storage, steam generators, electrical rotating equipment and preparation for return to service. Each railroad should modify the procedure to suit its conditions.

Freight-Car Axle Dimension Changed

The Committee on Axles has recommended for letter ballot an increase in the center dimension (k) of 6½- x 12-in. standard and alternate standard freight-car axles from 6-⅞ to 7-⅜ in. to reduce maximum stresses. This is a result of studies of numerous failed and cracked axles under cars in ore service. By increasing the k dimension ½ in., the stress at the center will be reduced from 21,300 psi to 17,300 psi, or 18.8 per cent, and the axle weight increased about 22 lb. The committee intended to apply the same change to the 6- by 11-in. axle, but requirements of Specification M-101 make double heat treatment mandatory. The heat-treatment question has been referred to the Committee on Specifications for Materials for study and recommendation.

To further the study of acceptable machine finish before rolling or burnishing, two member roads each have prepared four axles with finishes ranging from 300 to 64 microinches, all burnished to a finish of 16 microinches or better. These will be tested at the Research Center to determine the characteristics of the different machine finishes.

Many axles found defective by ultrasonic testing when examined in the laboratory show signs of previous overheating. The Committee emphasized the importance of the proper use of wet magnetic testing of overheated journals when machining before return to service. The General Committee has approved the recommendation of the Committee on Axles made at the 1959 annual meeting that all tubular axles be removed from interchange service at owners expense by January 1, 1962.

The Committee on Axles has summarized the results of three axle test programs run during the past year. Fatigue tests were made on diesel locomotive axles, used 1928 standard freight (black collar) axles and a comparison of rough-machined and "as-forged bodies" on raised wheel seat axles. Additional projects for future study include wheel and gear fit on diesel locomotive axles, fatigue strength of roller bearing axles at the journal area and axles with plated and hardened journals.

Six standard diesel locomotive axles with 8-in. bodies will be tested to develop design characteristics and recommended load ratings. Three have stress relief grooves between the inside edge of the wheel fit and the gear fit. On completion of this test, six similar axles with 8¼-in bodies will be run to obtain comparative data. These studies will determine the extent to which axle rating and designs can be standardized.

Composition Shoe Tests Inconclusive

Dynamometer tests at each of the three composition shoe manufacturers' plants have been made to determine whether these shoes are ready for road testing, the Committee on Brakes and Brake Equipment reports. Dynamometer tests were also aimed at establishing a standard test procedure for a specification similar to M-401 for cast-iron shoes. The laboratory tests simulated stopping a loaded freight car on level tangent track at speeds from 10 to 80 mph under both wet and dry rail conditions and also simulated a drag braking cycle. Tests have not been conclusive.

Two of the manufacturers require a heavy-duty composition shoe to meet the drag braking tests. Their standard shoes were susceptible to "fading" at high temperatures developed during the heavy drag. While the heavy-duty shoes performed well, their service lives are unknown. The third manufacturer's standard shoe met the drag test, but did not produce satisfactory results during stopping distance tests under wet rail conditions. Changes in the composition and shoe design are to be made to overcome this deficiency.

The committee reports more progress toward extending the COT&S for AB freight-brake equipment. A more effective hollow rod lubricating swab for the modern AB brake cylinder head has been approved as standard, effective January 1, 1961. This swab incorporates a metal retainer to support the felt portion and has proved superior in extended testing in all kinds of weather and temperatures.

A new lubricant—a silicon oil—has materially improved AB brake system performance by reducing the incidence of stuck brakes. After laboratory tests of 97,800 application and release cycles in temperatures ranging from minus 45 to 130 deg F, neither service nor emergency brake portions exhibited any undesired emergency applications. Mechanical parts of the valve have been modified by replacing the pistons in the emergency portions with rubber diaphragms. Some have been applied to captive cars for field test.

Despite a recent statement that progress with lubricants might make a 60-month COT&S possible this year, the brake committee reported that further experience will be necessary before an extension of the present mandatory 48-month cleaning period can be considered.

Studies are continuing on the use of anti-corrosive surface treatments for extending the serviceable life of the gasket groove in air hose couplings and points subject to wear and damage. Several treatments so

far are promising. The committee has made preliminary proposals for various installations of brake cylinder release valves with a single release rod for both the cylinder and the reservoir.

On cars with long-travel cushion underframes requiring flexibility either in the brake pipe or branch pipe, the committee recommends a flexible branch pipe. The pipe should be as short as practicable. The length must not exceed 60 in., which includes the dirt collector and cutout cock, and its related piping connections. The flexible connections must perform satisfactorily for over 60 months and be available as a reasonable standard common to member roads. A proposed revision of Specification 2518 will cover the details.

The committee has approved application of AC-1B brake equipment to 100 baggage cars. Some member roads have been authorized to equip new baggage cars with 26-C equipment in place of D-22AR brake equipment for service tests. Substitution of self-locking cap screws and nuts on air-brake equipment will be a subject of letter ballot action. It was recommend this apply to all cars built new or rebuilt after January 1, 1961. The committee again reports it will be impossible to determine braking characteristics of off-tread brakes until complete trains of such cars can be tested.

Cast Wheel Changes Recommended

Type A and B one-wear cast-steel wheels with modified rim section contours may be adopted as standard, effective January 1, 1961. The Committee on Wheels has recommended this as a letter ballot item. These wheels as now manufactured to Specification M-208 are so designed that the condemnable limit of tread wear can only be measured by flange height. The flange has a nominal height of 1 in. when new and 1½ in. when the tread reaches its wear limit.

The apex of the flange is the only reference point for gaging. Consequently, it must not be changed in any machining or grinding operation. To permit the determination of minimum rim thickness by the same gaging methods used on wrought-steel wheels, additional metal is to be added on the underside of the rim below the flange to provide a common gaging point. The average wheel weight will be increased by about 20 lb. Modified wheels are to be marked "CS1" to indicate to wheel-shop forces that such wheels may be turned to restore the entire tread and flange contour.

The committee has authorized 2,000 car sets of Type B one-wear cast-steel wheels with 0.75 per cent carbon for test and use in interchange service. They will be identified as experimental design AARX-7. If successful, it will be a further step in standardization of steel wheels for freight-car service, because the same carbon content is currently used in Type A cast-steel wheels and one-wear wrought-steel wheels.

Manufacturers of Type A cast-steel wheels and wrought-steel wheels have been authorized to place 5,000 car sets each of two-wear wheels in interchange. They have a 2-in. nominal rim thickness. Increasing use of roller bearings and higher mileages have led to requests for wheels with heavier rim thickness to provide for two full wear periods before condemning limits are reached. The cast-steel wheel will be designated as AARX-5 and the wrought wheel as AARX-6.

The Committee on Wheels concurred with the recommendation of the Committee on Car Construction on a letter ballot to require the use of steel wheels of at least 36 in. diameter under new freight cars of more than 70 tons nominal capacity with 6½ x 12-in. journals. This corresponds to axle loadings of from 52,500 lb to 62,750 lb for a nominal 100-ton car. The 36-in. wheel requirement went to letter ballot in 1959 and received many negative votes. It was sent back to the committee for more study. New larger truck designs can be required, or six-wheel trucks may be necessary where four-wheel trucks are now used, the Committee on Car Construction pointed out. Recent introduction of high-capacity cars has renewed interest in wheel wear.

"Admittedly, it is difficult to accurately determine the cause of the breakdown of the rail," the Car Construction Committee reported. "Due to the small area of contact now made between the wheel and the rail because of the present contour of the rail and contour of the wheel, the damage to the rail may be caused more by the gage corner metal flow. Shelling may result from load concentration due to lateral and vertical forces and the relation between contours of rail and wheel." AAR Research Department is investigating this problem.

During discussion of the car committee report, H. M. Nelson, vice-president, North American Car Corp., stated that the trend toward larger freight cars is inevitable and should not be restrained by any unnecessary wheel diameter restrictions. He said that the 33-in. wheel is adequate from a strength standpoint, and that the 36-in wheel is required only to lessen rail wear.

F. A. Fahland, Union Pacific general mechanical engineer, agreed that development of high-capacity cars could be impeded by requirements for larger wheels. Mr. Fahland quoted the 1958 report of the American Railway Engineering Association indicating that rail shelling could be relieved to some degree by reducing wheel loads or increasing wheel size. He pointed out that the A.R.E.A. had also reported that heat-treated rails have greatly increased life, and that rail head and wheel contours could be important factors.

W. H. Keleher, manager-equipment, Merchants Despatch Transportation Corp., commented that the introduction of low-deck piggy-back cars with 28-in. wheels would apparently be a step in the opposite direction.

Due to failure of wrought-steel wheels manufactured by the slab process and other older type wheels, the wheel committee recommended a letter ballot requiring the scrapping, at owner's expense, of all wheels with markings showing date of manufacture prior to January 1, 1922, when removed for any cause. Other letter ballot items include a limitation on journal run-out of no more than 0.005 in. total dial reading on second-hand axles when used with roller bearings. The axle end, or ends, at fault shall be re-centered before wheel seats are turned. Type B cast-steel wheels marked AARX-2, or with dates prior to May 7, 1958, cast on back of the plate, when going through the wheel shop with tread defects which could be corrected by turning or grinding, are not to be machined, but must be scrapped on the basis of another recommendation.

Roller-Bearing Applications Near 85,000

Freight-car roller-bearing applications show a 56 per cent increase over 1957. The Committee on Roller Bearings reported there were roller bearings on 61,196 interchange freight cars as of April 1, 1960. At the end of 1957, there were 39,222 cars equipped and by the end of 1958 the figure had grown to 45,965. The total of all freight cars equipped on April 1, 1960, including those of railroads, private-car owners and non-interchange equipment, was 82,415.

The committee reports conditional certificates of approval issued for Hyatt Hy-Roll taper bearing, classes C, D and E. Approval for test has been given to the SKF Piggybacker spherical gearing. Timken has received approval for a redesigned axle end cap which is interchangeable with the old design.

The committee has made several requests to roller-bearing manufacturers:

- To consider application of some identification marking for the various parts of the roller-bearing assembly;
- To mark the year of manufacture on the bearing;
- To develop possible design changes in standard adapters for the alternate standard pedestal opening which will prevent bearing displacement in service;
- To furnish recommendations for strengthening the pedestal key used with AAR alternate standard pedestal side frame which will prevent roller-bearing wheel and axle sets from coming out of trucks during derailment.

Reports of AAR alternate standard pedestal side-frame failures at the junction of the outer pedestal leg with the top of the frame have been referred to the Research Center. Apparently the section breaks when subject to braking action or car coupling impacts. The committee recommends a study of the dynamic test procedure for truck side frames to include a requirement that will stress the outer pedestal leg. Other side frames of this type will be tested to determine if any change in section is required at point of failure.

Roller-bearing cars represent 35.5 per cent of the Boston & Maine freight-car fleet, P. C. Dunn, assistant general manager, reported. He said this keeps his line in first place with regard to the percentage of total ownership among all roads. Mentioning the B&M efforts to end fixed per diem, Mr. Dunn said that his road makes no apology for the work its court suit has brought all lines. The result was the current car-repair costs and man-hour reports which all roads must supply the ICC at intervals during 1960.

Roller-bearing greases approved under the 1956 AAR specification by the Committee on Lubrication of Cars and Locomotives have been subjected to new tests of their rust-inhibiting characteristics. Four failed to pass the test, a standard one specified by the Coordinating Research Council. Manufacturers are submitting new products for the four which failed the test. Tests made under supervision of the Lubrication Committee indicate relubrication of some roller bearings could be extended from 18 to 36 months, but this will be studied further. Possible extension of the 90-day relubrication for the cartridge bearing is also under study.

Solid Bearings

Improvement in the performance of the solid journal-bearing assembly continues to receive most of the attention of the Lubrication Committee. "Continued reports from users of journal stops are very encouraging," it was reported, "and indicate that a wholesale application of efficient journal stops will greatly improve journal-box performance and produce substantial savings." Encouraging reports are also being received from test applications of 170-deg flat-back bearings in road service, and tests will continue.

Specifications for journal-lubricating devices have been clarified and made more strict. The Lubrication Committee approved limited applications of the Centra-Feed Journal Lubricator and the Flo-Pak Lubricator, and withdrew approval from five other devices during the past year. Application of lubricators to passenger cars, where possible, has been recommended for letter ballot. A six-month repack has been established for these passenger-car applications, and tests of extended repacks are currently under way.

Development of improved dust guards and real seals is being fostered by the committee. Limited applications on interchange cars have been authorized for the following: Baxeal rear seal, Fowler rear seal, and Oiltite journal seal. Use of conventional packing retainers with both lubricators and loose packing is to be discontinued if a letter ballot recommended by the Lubrication Committee wins approval. Displacement of

(Continued on next page)

1961 Rules to Include Many of These Recommendations

Numerous changes have been recommended for the present Interchange Rules by the Arbitration Committee. They will be submitted to letter ballot It is probable that the next revision will incorporate most of the following. They are listed by the Arbitration Committee as its "principal changes." Numbers following rule number are section and paragraph in that order, unless otherwise indicated.

Rule 3-2-9.—Tubular axles would be prohibited in interchange after January 1, 1962, because of their unsatisfactory performance in service. Rules 2-c, 10-g-2, and Passenger Car Rule 8-e would be altered to expedite removal of tubular axles from service.

Rule 3-h-5.—Addition of new paragraph requiring that secondhand geared hand brakes be reconditioned in accordance with Manual pages E-95 and E-96 in order that such brakes can be expected to give a normal term of service when applied to interchange cars.

Rule 3-j-3.—Addition requiring application of lubricators to all cars with conventional journal boxes which receive periodic lubrication attention after August 1, 1960. New Note 4 would permit rejection of empty cars not fitted with lubricators from owners. Rule 101, Items 169-J, K, L, M and N, would provide appropriate charges for lubricator applications. All these are aimed at speeding application of lubricators and keeping costs down.

Rule 4.—Modification of entire rule is recommended to place "more equitably" the responsibility for uncarded associated defects, both concealed and unconcealed. This will eliminate issuing of defect cards for minor damage.

Rule 5-b.—Addition of "except wrong repairs *not associated with handling line's responsibility under Rule 32*" to give more time for correcting wrong repairs associated with Rule 32 defects.

Rule 7.—Modification of second paragraph to simplify rules and facilitate machine accounting.

Rule 10-f-1.—Addition of new note to allow charge against car owner for non-remountable wheels which have been removed in process of checking axle for defects previously indicated by ultrasonic inspection. The axle defect need not be confirmed.

Rule 10-f-6.—Addition of new paragraph giving two-wear cast- and wrought-steel wheels (AAR X-5 and X-6) the same status as present one-wear wrought-steel wheels in regard to substitutions (Rule 10-c-3) and charges.

Rule 10-f-7.—Addition of section prohibiting turning and grinding of Class B cast-steel wheels having 1.5 per cent carbon content. These are AAR X-2 wheels manufactured prior to May 7, 1958.

Rule 17.—Modification of Paragraph C-4 to prohibit use of grade B knuckles which have been reclaimed by welding. Modification of Section e to discourage application of former standard R.S.S.&T. brake beams.

Rule 33.—Modification of Sections b-3, c, d, and e pertaining to damage to tank-car safety appliances making minor damage owner's responsibility.

H. M. Wood of the Pennsylvania, chairman of the Arbitration Committee, told of steps to eliminate loose waste from all journal boxes.

Rule 35.—Elimination of section authorizing charge for closing of hopper and drop doors on open-top cars. Defect cards would no longer be issued.

Rule 36.—Modification of Paragraph 13 to prohibit cars carrying improper advertising (Paragraph 1) from interchange. This would make defect cards and subsequent billing unnecessary.

Rule 61.—Modification of Section b and addition of new Section d to insure that car owner will not be charged for more than one in-date air-brake test in each 90-day period.

Rule 62.—Modification of second note is aimed at having new journal bearings applied when wheels are changed—an established AAR principle.

Rule 66-b-5 and 6.—Addition of new paragraph encouraging application of lubricators to conventional journal boxes at regular repack time (see Rule 3-j-3). This would permit installation without special shopping. Exception is granted for use of loose packing in non-standard journal boxes for which lubricators have not been developed.

Rule 66-c.—Modification aimed at elimination of packing retainers and Plypak packing containers. List of these devices in Rule 101 would also be eliminated, and similar change is to be made in Passenger Car Rule 7.

Rule 66-h-4.—Addition of new Paragraph justifying renewal of lubricators. Reasons are: not contacting journal; any scorched or burnt areas; glazing; torn for half of length; deteriorated or decayed fabric; metal parts or core contacting journal and missing.

Rule 85.—New third paragraph establishes as owner's responsibility the damage resulting from failure of cartridge bearing unit.

[The remainder of the recommendations involve changes in charges and billing procedures in Rules 91, 94, 101, 112 and 120. The Committee on Prices for Labor and Materials recommended changes in Rules 101, 107, 111, 112, and Passenger Car Rules 21 and 22.—Editor.]

these devices has been found to increase hot-box frequency.

L. B. George, chief motive power and rolling stock, Canadian Pacific, commented that the AAR has done more to improve solid bearing performance in the past three years than had been done in the previous twenty years. He said the CPR hot-box record is the best ever and is constantly improving as lubricator applications increase.

A. I. Sellers, acting superintendent mechanical department, Texas & New Orleans, said that his road's experience shows journal stops eliminate hot boxes. Action by individual roads in making applications can't do too much good, he added.

E and F Couplers Are Redesigned

Modifications of E and F couplers to meet present-day operating conditions have been recommended by the Committee on Couplers and Draft Gears for letter ballot. Changes in the F coupler include an increase in thickness of the shank top wall from 9/16 to ¾ in. to increase rigidity; a decrease in thickness of the shank bottom wall from ⅞ to ¾ in.; an increase in thickness of the vertical walls of the shank pivot pin hole, and larger radii at the rear of the shank pivot pin hole to reduce stress concentration. A new pin bearing block, using two springs, properly centers the block to permit easy application of the connecting pin. None of the changes affects interchangeability of parts.

The proposed E-60A coupler, with a shank length of 21½ in., is comparable to the high-tensile steel F coupler, having a maximum strength of 959,000 lb in tension and 980,000 lb in compression. If approved, the E-60A will supersede both the E-60 Grade B cast-steel and the lightweight E-60 high-tensile cast-steel designs.

Applications of special cushioning devices during the past year include

- Hydraulic shock absorbing underframes (Shock Control) with 18-in. travel in either direction for several Santa Fe box cars and two flats (RL&C, February 1960, p. 19);
- The same underframe with 10-in. travel for an additional 1,300 Santa Fe cars, bringing total Santa Fe applications up to 2,000;
- Shock control underframes with 10-in. travel to 50 Western Pacific 70-ton, 50-ft insulated box cars for tin coil loading.

The Welex hydraulic gear, previously approved for 100 interchange cars, has been applied to 57 test cars on the SP and to two on the Santa Fe.

Several roads have experienced train partings between tank cars where no failures of couplers or draft-gear attachments occurred, the committee reports. The opinion seems to be that uncontrolled vertical vibration is the prime cause. The Car Construction Committee has been requested to investigate suitable snubbing means for all tank cars. Tank cars are involved in many partings.

J. A. Angold, engineer of tests for the Santa Fe, commented on a train parting study his road has made. Prime offenders were short cars with high centers of gravity, such as tank cars which get to "galloping" at speed. During the period studied, helium cars were involved in 8 per cent of the partings while comprising a very much smaller proportion of all the cars handled. He said the top operated coupler seemed to have some advantage as far as its locking arrangement is concerned.

Certificates of Test approval were issued for two National Malleable rubber draft gears—MF-400-A and MF-491-A—for applications to 6,000 and 2,000 cars, respectively, with check tests to be made after two years' service. Two friction gears—the Peerless T-1 and Cardwell-Westinghouse Mark 40—were granted approval for unlimited application. Conditional approval was given Cardwell-Westinghouse for the friction gear M-11-S-1 fitting an 18½-in. pocket with one 1-⅞-in. follower.

Draft-gear impact tests under empty car, half-load, and full-load conditions are continuing at the AAR Research Center, with all eleven standard pocket gears completing tests under empty-car conditions. A series of half-load tests (60,000 lb load or 108,500 lb at rail) have been made on four gears to determine the effect of floating or unbraced loads on the distribution of forces and stresses in car underframes. Full-load tests are to follow. The 36-in draft gears and various sliding center-sill cars will be tested later under the same conditions.

Draft-gear life was discussed by K. A. Browne, C&O director of research. A statistical study showed that C&O loading damage claims go up on cars which have gears that have been in continuous service for more than eight years. Mr. Browne said that present standard gears are not adequate for lading protection and probably not for protection of car structures. He concluded by commenting that there is no substitute for travel in cushioning devices.

Diesel Fuels Still Under Study

Six railroads reported to the Committee on Lubricants and Fuels for Diesel Locomotives that they have been using fuels which "differ significantly from accepted distillate fuels in general use." At least three are continuing this service testing, but no new data from which conclusions can be drawn has been presented during the past year.

The Southern Pacific has sponsored research into the use of propane as a diesel locomotive fuel at the Southwest Research Institute in San Antonio, Tex. Work showed the EMD 567 engine could utilize liquid propane in a duel fuel cycle with smooth combustion, normal flame propagation, and reduction in rated output. Propane injection follows a pilot injection of conventional distillate.

A survey of diesel lubricating oil practices among 92 roads revealed that over 90 per cent of the lubricating oil was of the heavy-duty classification, with the remainder being of the straight mineral type. Relatively few are buying a base stock and preparing their own lubricating oil, amounting to about 2 per cent of the oil used.

Well over half of the railroads have drained diesel lubricating oil reclaimed. The majority have a commercial refinery do the work; make no attempt to segregate lubricating oil drainings, and use one additive for refortifying the reclaimed oil. Over 20 different additives are being used by roads and commercial refiners.

Reclaimed oil returned from the refinery averages about 70 per cent of the quantity sent in for reclaiming. The majority of the railroads mix the reclaimed oil with new lubricating oil in storage and in crankcases. While the usual diesel lubricating oil has a viscosity index below 75, the survey indicated that a number of roads were using some test oils having viscosity indexes well over 75.

Surveys show that while numerous tests are used by railroads to check storage stability of diesel fuels, there does not seem to be agreement on stability standards. Even oil suppliers presented a variety of methods. The ASTM is currently involved in establishing such standards—work which the Committee on Lubricants and Fuel rates as an essential preliminary to rating of fuel additives.

Tests by nine railroads indicate the General Motors needle valve injector, now offered as a replacement for the spherical check injector, reduces specific fuel consumption from 2.6 per cent at full throttle up to 11 per cent at idle. Smoking at idle and low throttle positions is reduced, and improved service life is indicated. Baldwin-Lima-Hamilton reported that needle injectors made by American Bosch and Bendix Scintilla have always been supplied with the series VO and 600 engines. With proper nozzles, BLH engines have a specific fuel consumption of 0.356 lb per bhp hr.

The rate of formation of benzene insolubles in crankcase oil is one of the best indications of engine condition and, if quickly and accurately determinable at the locomotive, would be an excellent maintenance guide. The relationship between benzene insolubles, filters, and oil additives is the determining factor in rate of engine sludge deposit formation, particularly in oil coolers, and is significant in piston ring and bearing wear. All of these can be reduced by controlling the benzene insolubles.

Because of the ability, periodically, to quickly and accurately estimate benzene insolubles at the locomotive would constitute an important maintenance tool, the search for a practical means is continuing.

Five member roads have tested one instrument employing a simple photoelectric cell and another road has tested a similar one from another source. They report little value for them in the railroad field. Another road is continuing a study of the use of Millipore filters for this purpose.

Work with the API Coordinating Research Council on lubricating oils for dif-

(Continued on page 27)

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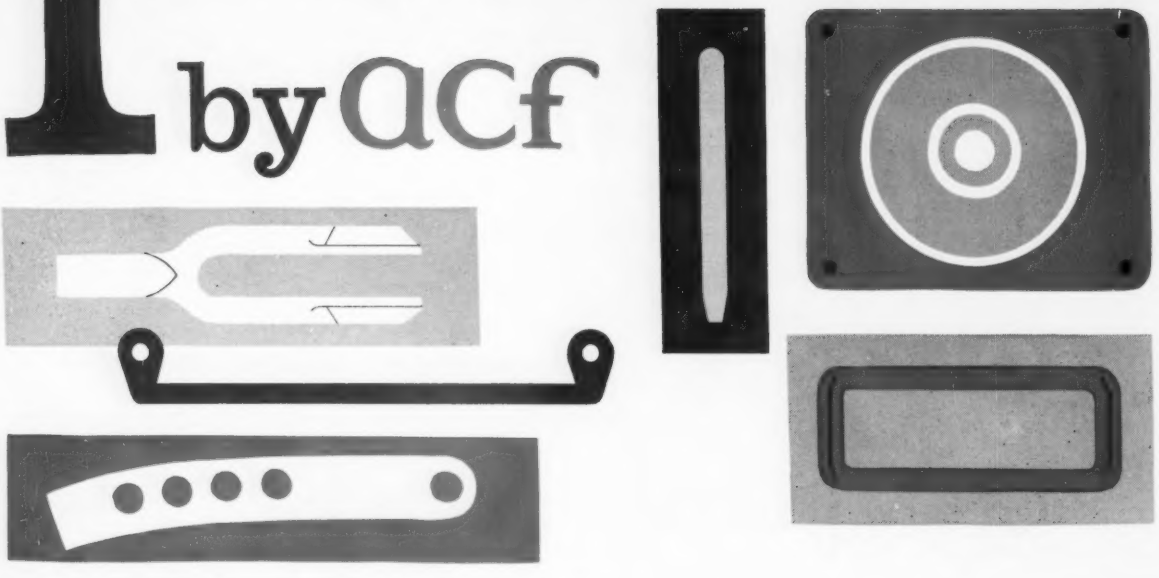

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AAR Mechanical Division

(Continued from page 24)
ferent engines and different operating conditions is continuing. Railroads, engine builders, and oil suppliers are participating. Another cooperative effort is being conducted with the AAR Purchases and Stores Division to develop a glossary of terms relative to fuel technology.

Truck Components Get Attention

Cars with trucks having various journal-box modifications are currently undergoing tests on seven member roads, the Committee on Car Construction reports. Changes were made to minimize wear and better distribute impact forces on the axle at the dust-guard seat.

Two methods have been tried to reduce the tendency of the journal-box dust-guard flange to roll the juncture of the journal fillet and dust-guard seat on axles. In the first, the dust-guard outer-wall opening has been reduced to the same width as that of the inner dust-guard-wall opening. This could reduce the axle scoring at the bearing fillet and shoulder, but the inner wall would still be in position to peen over the fillet shoulder or score the fillet when the axle is forced out of its normal position. In the second method, the inner dust-guard-wall opening was increased to the same width as that standard for the outer dust-guard-wall opening. Roads can test the applications for a year, and reports will be submitted in early 1961.

Application of welded ribs in journal boxes of existing freight cars, if desired by car owners to retain journal lubricators, has been recommended for letter ballot. A pressed or rolled ⅛- x ⅝- x ⅝-in. angle may be used. Sharp edges must be removed, and the front horizontal leg rounded with a ½-in. radius. The vertical leg is placed downward so as not to interfere with application of journal stops.

Another letter ballot item recommends that page D-15-B covering integral journal boxes with the anti-waste roll ledge be removed from the manual. These boxes will not accommodate conventional journal lubricators.

Tests have been authorized for a moulded fabric center plate lining, ¼ in. thick, on 500 cars in interchange. The 1-⅛-in. minimum depth of the vertical bearing surfaces of the center plate must be maintained as required by Interchange Rule 20 (d). Liners are phenolic laminated material, graphite impregnated, and the outer edges are rounded to conform with the fillet in the casting bowl. The committee is also encouraging development of new center-plate lubricants.

An AAR code for designating design features for side frames and truck bolsters having built-in snubbing devices has been developed by the Truck Manufacturers Engineers' Committee. The code is set up to identify interchangeable frames and bolsters produced by any manufacturer. If adopted, it will simplify applications to foreign cars, provide use of code numbers for IBM stocking and purchasing, and eliminate the present system of marking frames and bolsters with individual railroad identifications. The code will be submitted for approval to a special joint committee of representatives from the Committees on Car Construction and Purchases and Stores.

A joint sub-committee of members from the Committees on Car Construction, Brakes and Brake Equipment, and Wheels reports some progress in studies of standardization of applying off-tread brakes to freight cars. The committee recommends to the manufacturers that the bolt circle of the off-tread disc brake be twelve ⅝-in. holes, with 11-NC-2 threads on a 9½-in. diameter bolting circle, and with the shoulder turned on the wheel hub to 8-3/16 in. diameter. Other details—disc, brake lining, and head —will be considered at a subsequent meeting.

A standard method of marking and identifying axles tested by sonic methods under cars on repair tracks or in yards has been proposed. Stencilling of 2-in. numbers at the lower end of the spring column nearest end of car is to be used to indicate month when axles have been tested by reflectoscope, echoscope, ultrasonic, sonic, or other similar methods.

Modification of Plate B by a note clarifying the clearances for cars with long wheel bases and overhangs, withdrawn at the 1958 and 1959 meetings, is currently the subject of a questionnaire. The Committee on Car Construction will determine if sufficient improvements have been made in railroad line clearances to permit Plate B to remain unchanged, restrict width as truck centers are increased over 41 ft 3 in., or be expanded. The summarized data will be subject to letter-ballot action.

A request has been made by a member road to reduce the insulation presently required for an "RB" insulated box car in order to increase the inside dimensions rather than alter the basic construction of the car. Thermal efficiencies of improved insulation materials will be determined to see if a change is feasible. A standard method of testing insulating materials for refrigerator cars will develop acceptable materials to meet requirements of Rule 3.

The Committee on Car Construction reports two new methods of securing trailers on piggyback cars:

- General American G-85 all-purpose car, with collapsible standees which will accommodate trailers with or without standard Clejan axle dolly arrangements. An adapter is available for the standee which will hold trailers with or without king pins.
- North American collapsible hitch without shock absorbers for holding trailers with king pins. The hitch is operated by a tractor.

Improvements in existing tie-down devices, utilizing the built-in shock absorbers of the Clejan car, include cradles for hauling 24-ft containers and Polaris missiles, and the Whitehead and Kales rack semi-permanently attached for hauling 12 standard automobiles or 15 compacts (RL&C, June 1960, p. 30). ACF has developed an adapter pin for its hitch to hold trailers without king pins.

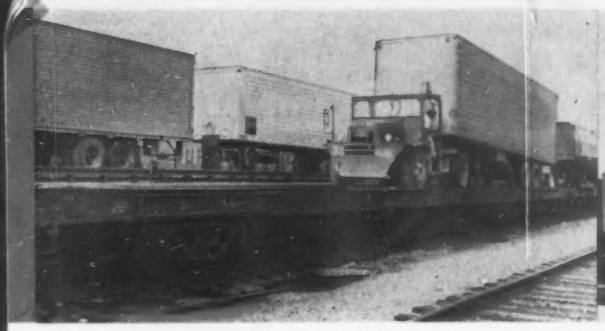
Elimination of present AAR standard brake-shoe keys and designation of the three alternate standard spring keys as standard will be submitted for letter ballot. AAR Mechanical Research report issued early this year indicated that excessive brake-head wear resulting from use of the present standard key is eliminated by using the spring type.

A standard arrangement for a 70-ton covered gondola car for handling steel coils and finished steel products has been prepared.

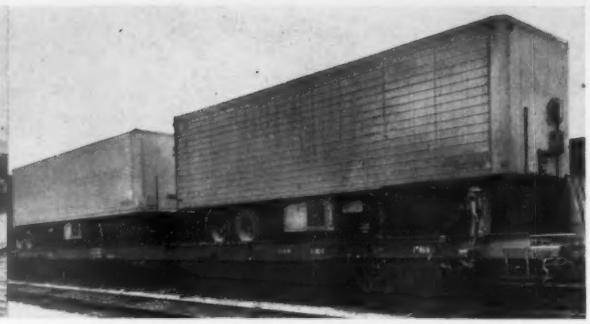
Location of angle cocks on freight cars equipped with AAR Type F interlocking couplers and standard draft gears would be standardized at 11-in. horizontally from car center line, from 2½ in. to 3½ in. below the coupler center line, and 2½ in. back of the striker face. It has also been proposed that retaining valves be located not more than 5 ft above the track on new, rebuilt and heavy repair cars after January 1, 1961. The retainer would be 5 to 7 in. inboard of the end ladder on all types of fixed-end cars and 5 to 7 in. toward center of car from side ladder on drop-end cars.

EJ&E Designs Tinplate Coil Car

G.F. Bachman, chief mechanical officer of Elgin, Joliet & Eastern, told of coil car his road has developed. Load retarders in car floor (left) are designed to grip strapping, length of which provides for controlled shift of lading. Two of counterbalanced, hinged covers on car can be folded back for forklift or crane loading of coiled tinplate.



The PS-4PB Piggyback Flat Car loads and unloads so quickly and easily you'd think it was designed with the tractor driver in mind! The continuous one piece 85-foot combination rub rail and side sill makes trailer locating and positioning faster than ever before.



Two 40-foot trailers with front mounted refrigerating units have room to spare on the all steel deck of the PS-4PB. Conveniently located tie-down arrangements secure any type or size of trailer in a matter of minutes.

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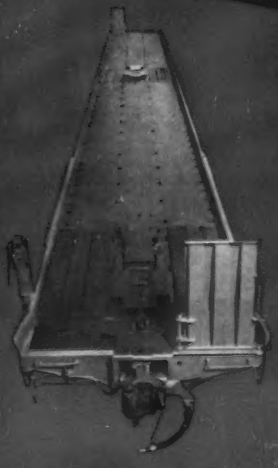

Trailer Train Company operated its piggyback fleet nearly 119,000,000 miles in 1959. Besides being an increase of 108% over 1958, these millions of miles have record revenue significance as more than 90% was loaded mileage. To achieve this kind of growth and performance Trailer Train has relied heavily on the in-service dependability of the Pullman-Standard PS-4PB Piggyback Flat Car. With 1650 PS-4PBs in service or on order since 1958. Trailer Train is assigning the PS-4PB an important role in plans for future expansion and achievement.

The PS-4PB is the most widely used flat car for trailers. Thirteen railroads and other users already have ordered or put into service more than 2500 of these built-to-serve flat cars.

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What Causes Wheel Tread Defects?

Part 1: Shelling

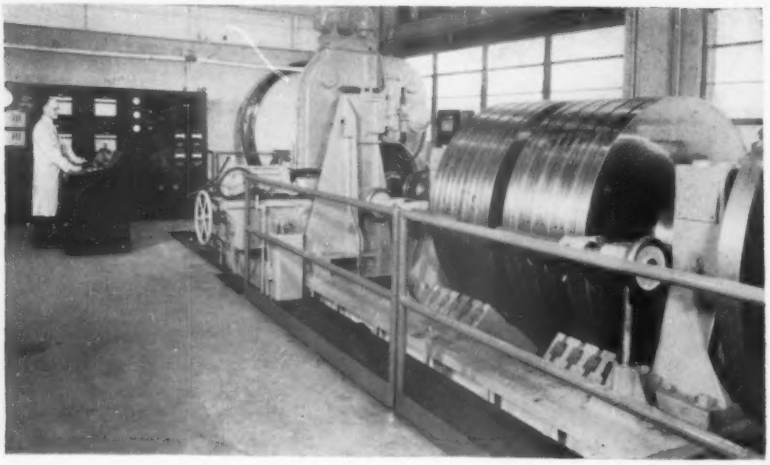
Dual functions of the railroad wheel —serving both as a brake drum and a means of locomotion—impose combinations of dynamic and thermal stresses. These stresses can cause defects, such as thermal cracking and shelling, which can make it necessary to remove wheels from service before they are worn out. Complete failure of a wheel may result from abnormally severe braking conditions, but, fortunately, complete failures that result in derailment are rare.

First of two installments based on paper prepared by J. M. Wandrisco and F. J. Dewez, Jr., Applied Research Laboratory, United States Steel Corp., for presentation before the ASME-AIEE Railroad Conference at Pittsburgh, Pa.

As in any design problem, materials are selected on the basis of the static and dynamic stresses that they are expected to withstand in service. The stresses any material can withstand are limited. Although the highest strength material for a given application is always desired from the standpoint of safety, economy often dictates that a material with less desirable properties, but with an adequate factor of safety, be used.

The higher speeds and heavier loads that have resulted from dieselization have greatly increased the stresses that railroad wheels must withstand. Therefore, the development of wheels with improved resistance to these stresses is necessary to keep pace with the progress being made in railroading.

Shelling of this wheel occurred in actual service. U. S. Steel research has shown that this type of defect is apparently the result of fatigue caused by rolling under load.



Dynamometer and control panel at U. S. Steel Research Center which are used to simulate wheel loads, speeds and braking pressures well in excess of those actually experienced.

The approach to this problem of developing improved railroad wheels, made by United States Steel, was first to gain a detailed knowledge of the mechanisms and causes of the different tread defects that devolp during service. Results of metallurgical investigations of numerous heavy-duty, heat-treated wheels that contained defects which originated and developed during service—studies of the macrostructure, the microstructure, the mechanical properties, the residual stresses, and the fracture surfaces—were made.

These studies were supplemented by laboratory tests on full-size wheels under simulated operating conditions on a large inertia dynamometer at the United States Steel Research Center at Monroeville, Pa. This machine can subject wheels ranging in size from 24 to 48 in. diameter to conditions of speed, wheel loads, and braking pressures ranging from those that equal service conditions to those that exceed them by several hundred per cent.

Rolling Load Defects

"Shelling" of railroad wheels is the defect characterized by expulsion of pieces of metal from the tread surface. Although it is not a potentially hazardous defect from the standpoint of safety, shelling causes damage to equipment through shock and vibration. Service metal is lost with removal of shelled areas by machining.

Studies were made of wheels that shelled in service after being subjected to the usual on-tread braking as well as a wheel equipped with disc-type brakes. These studies have indicated that shelling is essentially a fatigue failure that is caused by rolling loads. Braking stresses do not appear to cause shelling. The formation of structurally weakened metal as the result of the heat of braking friction is believed to accelerate the formation of shelling cracks. Shelling of tender-truck wheels used to be quite common, yet many of these wheels were not braked. It is generally recognized that the wheels most heavily loaded shell more frequently. Experience has also indicated that higher-hardness wheels are more resistant to shelling.

Macroscopic examinations of radial-

(Continued on page 32)

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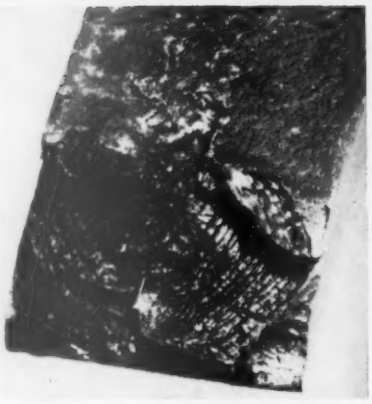
tangential sections from shelled areas have indicated that shelling is caused by cracks that form at angles of 30 to 50 deg to the tread surface. When two shelling cracks of opposed orientation meet beneath the tread surface, the metal between the cracks is loosened and is subsequently expelled from the tread.

Studies of the fracture surface of shelling cracks indicate that they contain progression ring patterns typical of fatigue failures. The orientation of the progression rings indicates that the cracks initiate at finite points in the tread surface and that they propagate by fatigue into the rim.

Macroscopic examination of the rims of wheels subjected to the usual tread braking revealed that the shelling cracks started immediately adjacent to those areas that had been heated at least above the lower transformation temperatures during braking. The adjacent area in which shelling originated has been heated to just under the lower transformation temperature; it has been tempered. Metallagraphic examination revealed evidence of plastic deformation both in the tempered areas in which the cracks originated and in other tempered areas that did not contain cracks.



Fracture surface of shelling crack shows progress to tread surface which is at top center.

Orientation of the shelling cracks in the wheel equipped with disc-type brakes was similar to the orientation of the shelling cracks in wheels equipped with tread brakes. Again, evidence of severe plastic deformation was observed both in those areas in which the shelling cracks originated and in other areas of the tread that did not contain shelling cracks.

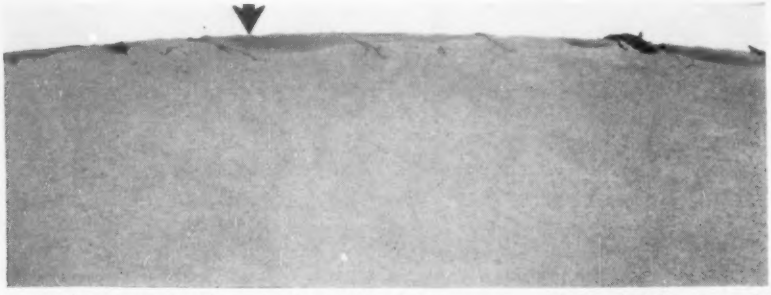
Because shelling cracks are oriented at 30 to 50 deg to the tread surface—approximate direction of the maximum shear plane—they are assumed to be caused by high shear stresses developed by rolling loads. That the shear stresses at the tread were high seems evident from the fact that areas in which the cracks originated showed evidence of severe plastic deformation.

Evidence of severe plastic deformation was observed in parts of the tread that did not contain shelling cracks. It is assumed that plastic deformation precedes the formation of the crack.

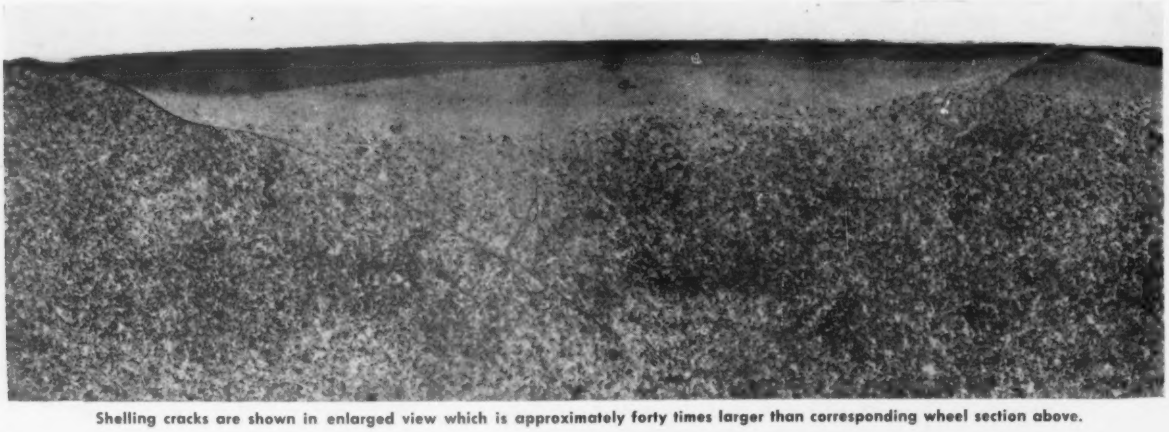
Repeated applications of the shear stresses as the wheels rotate are believed to cause parts of the tread to fail in shear. Cracks thus formed propagate by fatigue into the rim. The formation of tempered areas as the result of braking friction apparently accelerates the rate of formation of the cracks.

The stresses that occur near the contact surface between a wheel and rail have been calculated by several investigators. Thomas and Hoersch discovered that the maximum shear stress in the rim of a wheel under radial static load occurs at some distance underneath the contact area. The plane of this maximum shear stress was shown to be at an angle of 45 deg to the contact surface. However, when the frictional forces due to rolling load are also considered, the maximum shear stress can occur in the contact area, and its calculated value can be up to 1.5 times the calculated value of the maximum shear stress under a static radial load. It has also been shown that the plane of the maximum shear stress may be shifted under a rolling load, which may account for the variation in the orientation of the shelling cracks. Examinations of samples taken at random from shelled wheels have failed to reveal any indication that shelling cracks originate beneath the tread surface.

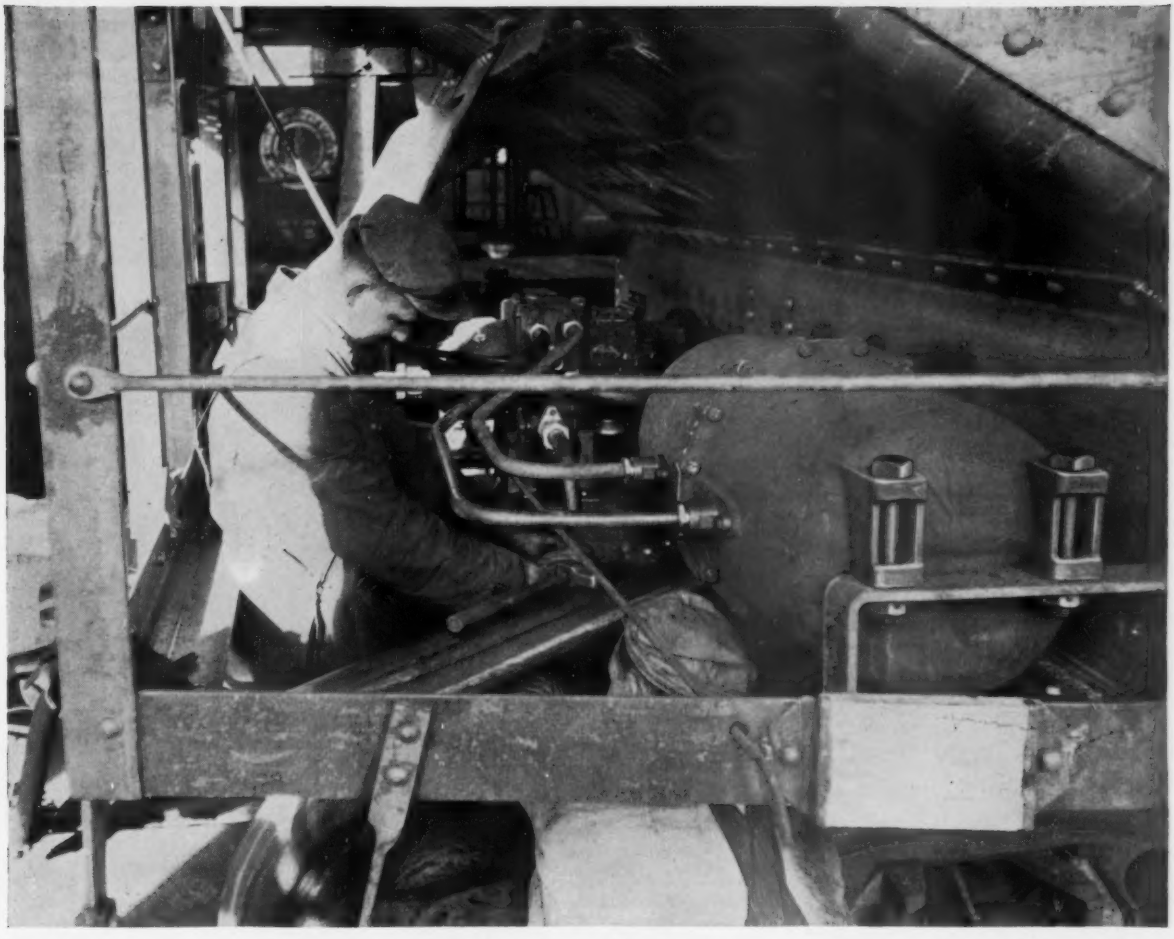
(*To be continued*)



Section through wheel, with tread surface indicated by arrow, shows relation of shelling to cracks which are developing around the surface. Enlarged section is shown directly below.



Shelling cracks are shown in enlarged view which is approximately forty times larger than corresponding wheel section above.



there are two safe lock nuts for air brake equipment that are also the most economical

The ***M·F Uni-Torque*** lock nut. Prevailing torque lock nut that will withstand terrific vibration and shock loading.

The ***M·F Two-Way*** lock nut. Has the added speed of either-end application, and the *center* lock permits bolt end to be flush with the top of the nut.

BOTH PROVIDE COMPLETE RELIABILITY AT LOW COST

The ***M·F Uni-Torque*** and ***Two-Way*** lock nuts are *all-metal,* deflected thread lock nuts—a locking principle with a successful record of more than 40 years of safe fastening for air brake equipment.

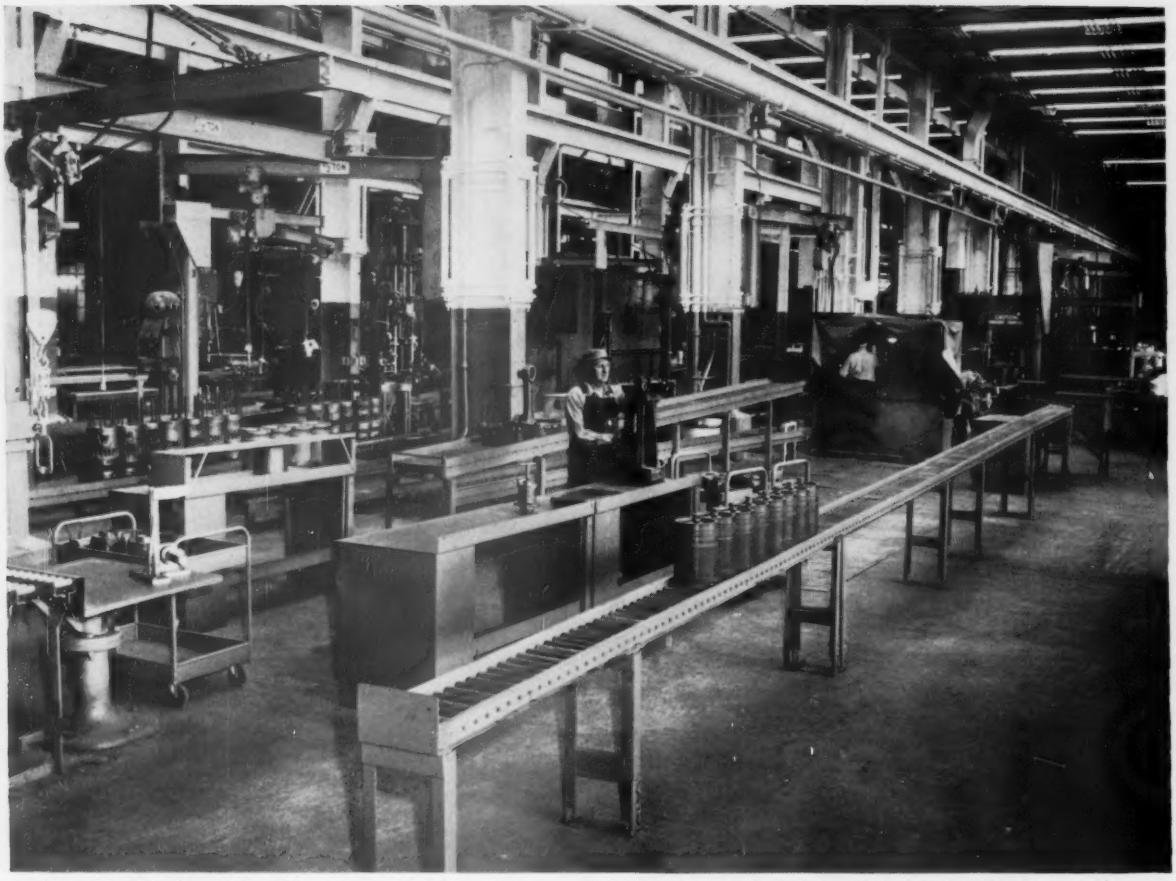
These *proven* lock nuts combine *reliability* with a very substantial savings over the non-metallic type.

Why spend *more* to sacrifice proven protection?

M·F ***MACLEAN-FOGG LOCK NUT COMPANY***

5535 N. Wolcott Avenue • Chicago 40, Ill. • EDgewater 4-8420

IN CANADA: THE HOLDEN CO., LTD., MONTREAL



Power assembly shop utilizes roller conveyors for live storage as well as for movement of components between reconditioning operations.

N&W Overhauls Power Assemblies

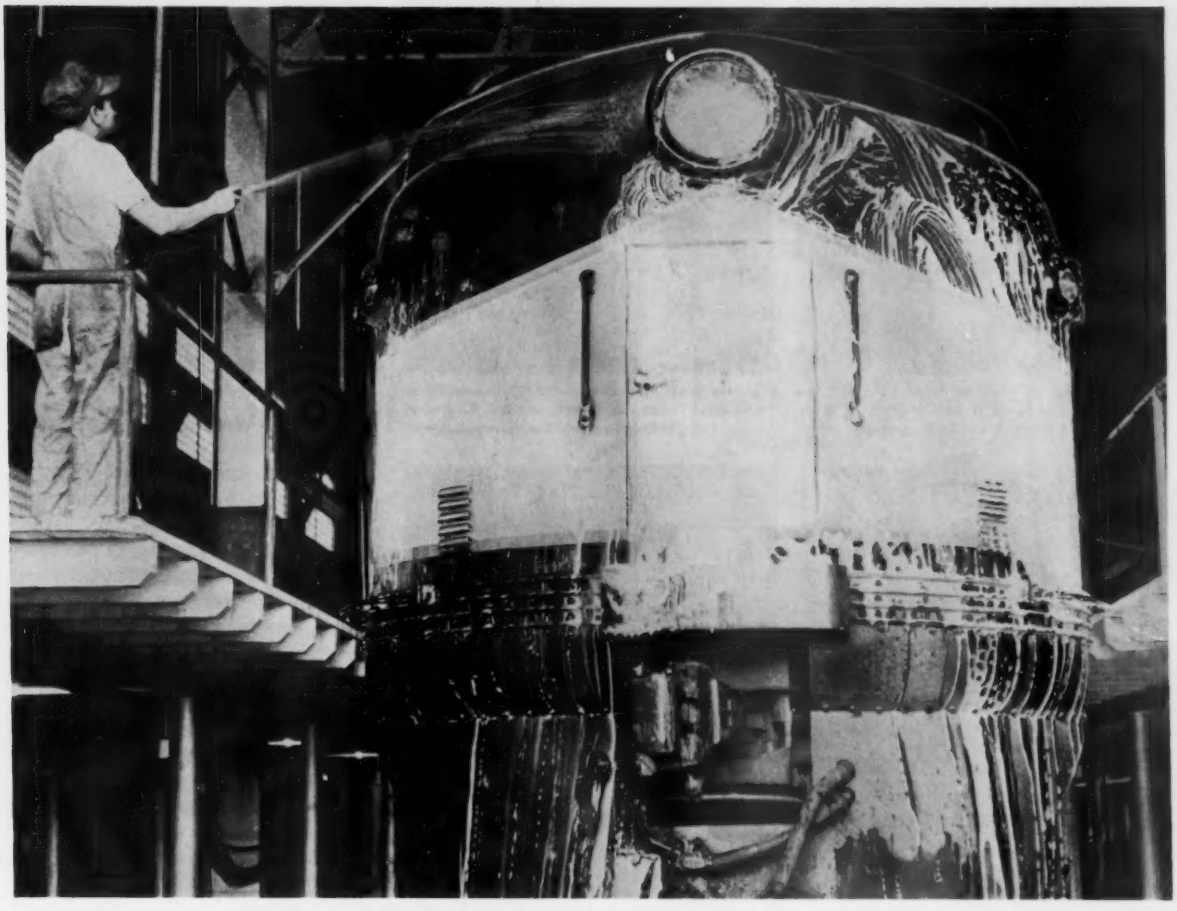
Alco cylinder heads are ready to enter the cleaning machine to left of operator. The conveyor can be raised and lowered to receive variety of carriers on which the various Alco and EMD engine components are moved through cleaning and ensuing work stations.

Power assemblies—liners, heads, pistons, rods and related parts—are now being overhauled by the Norfolk & Western in a recently established shop at Roanoke, Va. This shop has been arranged and tooled to handle the power assemblies both of Alco and EMD locomotive diesel engines, applying approximately the same degree of mechanization to the work on both types. N&W locomotives have Alco 244 and 251 type diesel engines and EMD 567-C and 567-D diesel engines.

The recent merger of the Norfolk & Western and the Virginian means that the majority of the former VGN diesel roster—all Fairbanks-Morse units—will now be overhauled at the Roanoke locomotive shop. It is expected that some of the F-M power assembly components can be processed on the existing power assembly lines.

(Continued on page 36)

Oakite adds more POWER to your MANPOWER



What's NEW in diesel washing?

OAKITE 202—that's what's NEW!

In railroad maintenance shops throughout the country, word is getting around that today's best buy in diesel-washing compounds, is the new, liquid detergent—Oakite 202. Why all the excitement about 202? Because it is giving cost-conscious roads all the economy, efficiency, versatility and safety they can use these days. Oakite 202 is definitely adding more power to their manpower.

This many-purpose material makes a quick mix with water. It forms a rich, sudsy solution that cuts clear through road film, bug juice, oil—even light carbon.

Oakite 202 is rough on soil, yet it's easy on equipment surfaces . . . safe for aluminum, stainless, paint, plastic, decals. This extra measure of safety, plus 202's vigorous detergent action make it the perfect choice for cleaning passenger car interiors, too. One important road puts it to work cleaning lounge and dining car carpeting. They call it "the universal cleaner"!

You can get the complete story on fabulous Oakite 202 by sending for a copy of Special Bulletin 40A. It's FREE, of course. Write Oakite Products, Inc., 46 Rector Street, New York 6, N. Y.

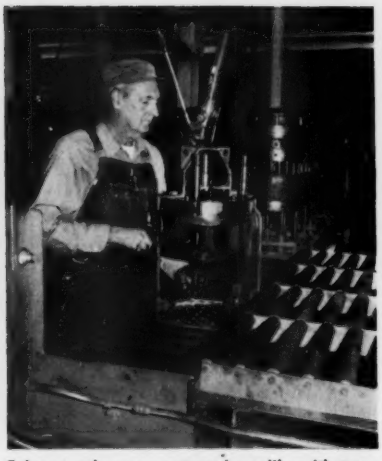
OAKITE

SCIENCE

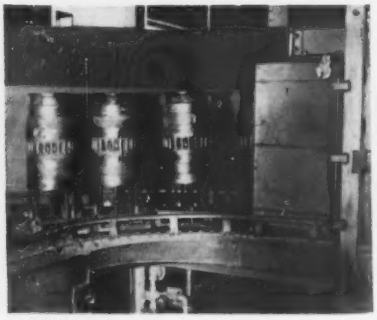
over 50 *Est. 1909* *years' leadership in industrial cleaning*

Skid, with Alco 251 power assembly being removed from it, is versatile unit which also holds four Alco 244 or EMD power assemblies.

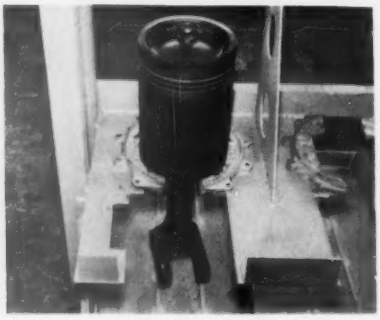
Hoist is used to tear down EMD assembly on "universal" skid. Cast-steel trunion fixture remains with EMD head for entire repair cycle.



Exhaust valves are removed readily with trunion fixture. After stripping, head moves on roller conveyor to the cleaning machine.



Liners from cleaning machine are taken from carriers and placed upright on conveyor.

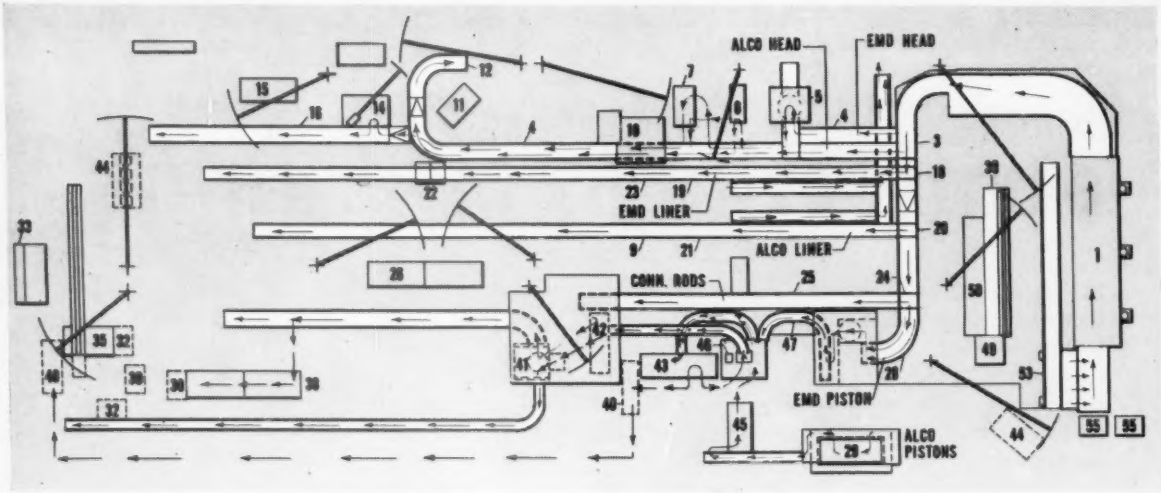


Lifting lug is placed in piston crown as it rests on skid platform after liner removal.

(Continued from page 34)

Conveyors have been arranged to permit smooth flow of the various parts of each of the types of power assemblies from initial cleaning through successive inspection and reworking to reassembly. The conveyors have been laid out in an area which allows them to be long enough to form "live" storage areas between operations. The N&W has developed skids, fixtures, jigs and positioners to simplify handling and reworking problems.

When the decision was made to es-

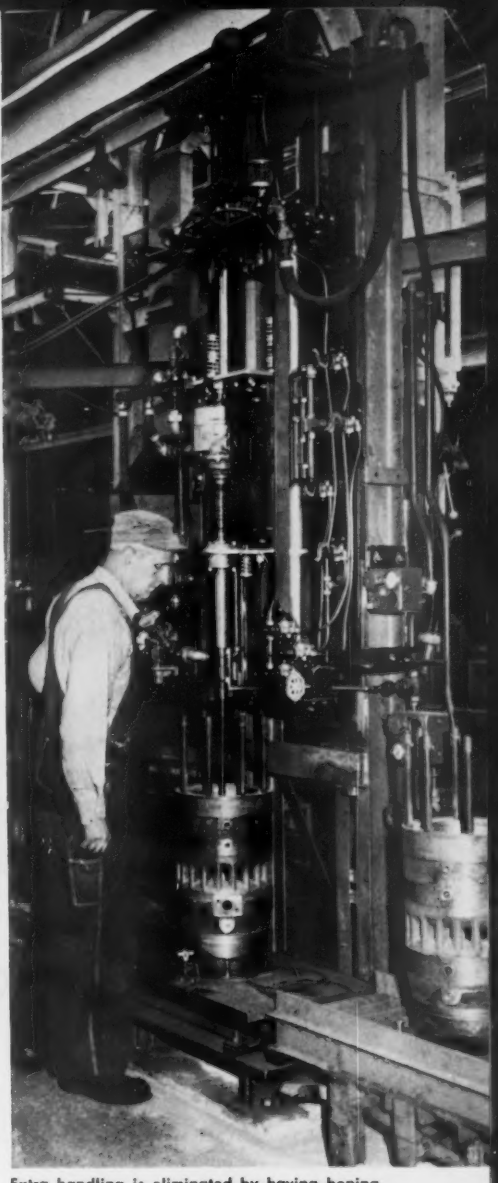


1—Automatic cleaning machine
3—Reciprocating conveyor
4—Roller conveyor, Alco and EMD heads
5—Shot blast for EMD head
6—Hydro-test for Alco heads
7—Bench for heads
9—Monorail for Alco liner line
10—Magnaglo
11—Alco 251 engine head bench
12—Alco 251 engine head reassembly
14—Alco 244 and EMD valve seat reaming
15—Alco 244 and EMD head bench
16—Head reassembly
18—Reciprocating conveyor
19—Roller conveyor for EMD liners
20—Reciprocating conveyor
21—Roller conveyor for Alco liners
22—EMD liner honing
23—Monorail with 1,000-lb hoist
24—Reciprocating conveyor
25—Roller conveyor for rods and related parts
26—Alco liner bench
27—Shot blast and brush machine for EMD pistons
28—Roller conveyor for EMD pistons
30—Platform truck for rods
32—Platform truck for EMD piston pins and carriers
33—Work bench for applying rings
34—Conveyor for assembled pistons and rods
35—Bench for assembling pistons and rods
38—Bench
39—Roller conveyor for pallet return
42—Platform truck for Alco pistons
41—Wash tank
42—Magnaglo
43—Lathe for regrooving pistons
44—Power assembly jig
45—Work bench for Alco pistons
46—Surface plate for pistons
47—Inspection bench for EMD pistons
49—Disassembly work bench
50—Solvent cleaning for piston pins and carriers
53—Reciprocating conveyor
54—Fixture for assembling Alco piston and rod
55—Shelf truck for valves

Power assembly shop has been arranged for regular flow of engine components through successive cleaning, inspection, repair, assembly operations.

Magnetic particle testing of head is completed with trunion on conveyor. Fixture does equivalent of passing cable through valve guides.

Exhaust valve seats are faced preparatory to grinding. Trunion fixture does not need to be removed even for this complicated job.



Extra handling is eliminated by having honing machine built into roller conveyor system for doing EMD liners. Alcos go on adjacent line.

stablish the power assembly shop, the area chosen was adjacent to the erecting shop. Power assemblies removed from units undergoing repairs can be delivered on skids to the beginning of the "production line." At this point there is a jib crane which is used for removing the individual assemblies from the skids and in handling parts during subsequent tear-down. This is but one of a dozen jib cranes located at various points through the power assembly shop. It was the aim of the shop engineers to provide an individual jib crane for each operation requiring mechanical lifting. No attempt was made to "double up" on these cranes so that it is not necessary for workers along the line to wait for cranes at any time.

Conveyors are arranged at convenient working height for each operation. This means that elevators are necessary at various points along the lines to raise or lower individual components to another level to facilitate work. Following disassembly and initial cleaning, both EMD and Alco cylinder heads are processed through the same work area and, in general, move on the same conveyor system. Completely separate conveyor systems have been set up for the Alco and EMD liners. Flow patterns for rods, pistons and related parts are complicated, but it has been possible to utilize the same conveyors for some of these components through portions of their reworking cycles.

All of the reworked components flow out on conveyors to an area where the power assemblies are again built up. This work is done on a conveyor system.

Assembling reconditioned piston and rod takes place at entrance to special divided conveyor which allows rod to pass through.

Power assembly parts are assembled as they are loaded on skid following reconditioning. One jib crane reaches all points in assembly area.

Single-unit, two-cab car weighs 52,000 lb. Cars to be coupled in pairs weigh about one ton less each. Route is 12.8-mile subway-elevated line.

Philadelphia Gets First Stainless

Deliveries have started on 270 stainless-steel rapid-transit cars being built by Budd for the City of Philadelphia and the Philadelphia Transportation Company. These cars will completely replace the fleet of heavyweight transit cars previously used on the Market-Frankford subway-elevated line. For the first time, a complete transit operation will be conducted with stainless-steel cars.

Weight-saving and the corrosion-resistant properties of stainless steel played major roles in the choice of this material for the new cars. It was calculated that $428 annually would be required for painting and body repairs to equivalent carbon-steel cars. The specification permitted a premium of $7,000 in quotations for stainless-steel cars. Cost of amortizing this additional investment over 35 years at 5 per cent interest was calculated to be the equivalent of the $428 maintenance figure. The completed cars weigh approximately 52,000 lb which is expected to cut operating costs under those of the older, heavier PTC equipment, or of equivalent carbon-steel cars of modern design.

The order is made up of 46 two-cab cars which can operate as single units, and 224 single-cab cars which will be semi-permanently coupled into 112 two-car sets. While each two-cab car has a complete installation of control and auxiliary equipment, the single-cab pairs will have the air compressor on one unit and the motor-generator and battery on the other.

Each car is powered by four 100-hp, 600-volt d-c traction motors through close-coupled, right-angle hypoid gear drive units. Acceleration is 2.75 mphps and dynamic braking is provided. Westinghouse SMEE air brake

Partial List of Equipment on PTC Cars

Trucks	Adirondack Steel Castings Co.
Wheels and axles	Baldwin-Lima-Hamilton
Brakes and brake shoes	American Steel Foundries
Hand brake	National Brake Co.
Air compressor, air gage, air-brake system, Cineston, horn	Westinghouse Air Brake
Couplers, draft gears, drawbars, and drum switch	Ohio Brass Co.
Journal bearings	SKF Industries
Center pin	W. H. Miner, Inc.
Car-body insulation	Gustin-Bacon Mfg. Co.
Sound deadening	Flintkote Co.
Steel	Republic Steel Corp.
Plastic faced aluminum and plywood	United States Plywood
Plastic end panels	Modular Moulding Corp.
Transite panels	Johns-Manville
Wire and cable	Kerite Co.
Switch boxes, panels, relays	Safety Electrical Equipment Corp.
Traction motors and controls	General Electric Co. Westinghouse Electric
Light fixtures	Luminator, Inc.
Circulating fans	Westinghouse Electric Corp.
Heaters	Vapor Heating Corp.
Heating and ventilating controls	Vapor Heating Corp. Westinghouse Air Brake
Seats	Heywood-Wakefield Co. National Seating Co.
Seat coverings	B. F. Goodrich Co. E. F. Timme Corp.
Doors and door closers	O. M. Edwards Co.
Door controls	National Pneumatic Co.

Cars seat 54 and can carry 120 standees. Interiors need no paint.

Roof is welded to top chord. Plastic upper front then goes on.

Transit Car Fleet

with Cineston control is normally used for stopping from 4 mph—the speed at which dynamic braking fades out. In emergency, the air brake can produce a uniform 2.75 mphps deceleration, governed by a variable load valve in the air spring suspension.

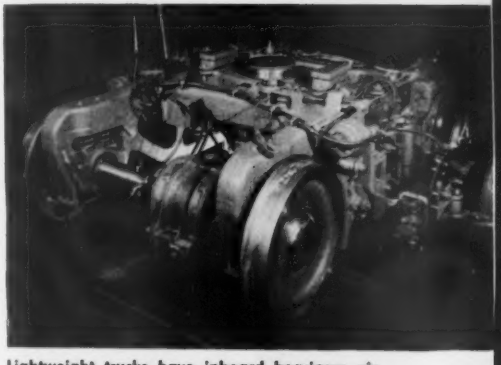
The four-wheel, cast-steel trucks are similar to those supplied for other recently built transit cars. They have inboard roller-bearing journals, package brake units, and a combination coil and air-spring suspension which provides for automatic leveling of the car by the air springs as passenger loads vary. The car structure is designed as a girder, using roof and floor as the chord members which are connected by the sides that serve to carry the shear along with the side sills. Pier panels are stampings with the window recesses serving as stiffening flanges. All structural members and sheathing are stainless steel, with the exception of the end underframe units which are built up of copper-nickel-molybdenum low-alloy steel. One of the cars satisfactorily passed a 200,000-lb compression test and vertical load test at Budd's Philadelphia test plant.

Interiors will not require painting. Floor covering is rubber sheet. Ceilings and walls are plastic-faced panels, and all other interior surfaces are stainless steel. While most of the seating is placed transversely, standee capacity is not impaired because of the staggered door arrangement.

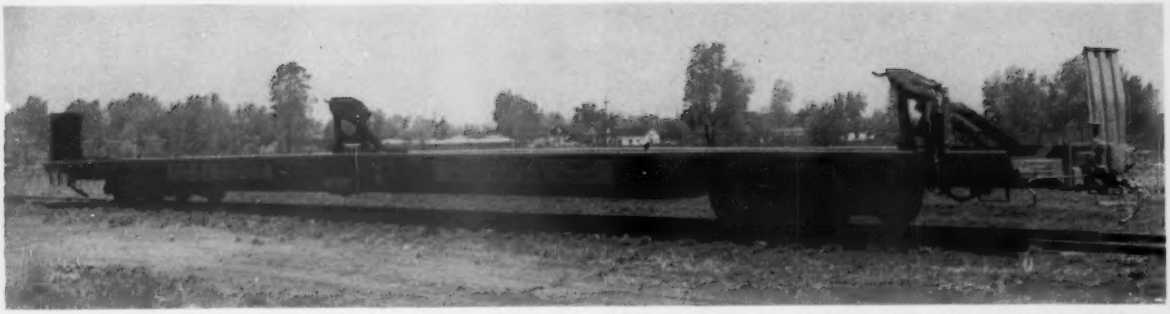
Four roof-mounted fans draw up to 12,000 cfm through overhead louvres and deliver this ventilating air through ring-type diffusers. Ventilation is regulated by thermostats which control dampers in the roof louvres and also regulate fan speed. Each car has strip-type resistance heaters which are rated at approximately 20,000 watts. Illumination is supplied by 600-volt fluorescent tubes. Electro-pneumatic door engines are used on the six side doors.

Over pulling faces length of the completed car is 55 ft 4 in. Maximum width is 9 ft, and maximum height over the ventilators is 12 ft 9-7/16 in. The cars have 28-in. wheels and the truck wheel base is 6 ft 8 in.

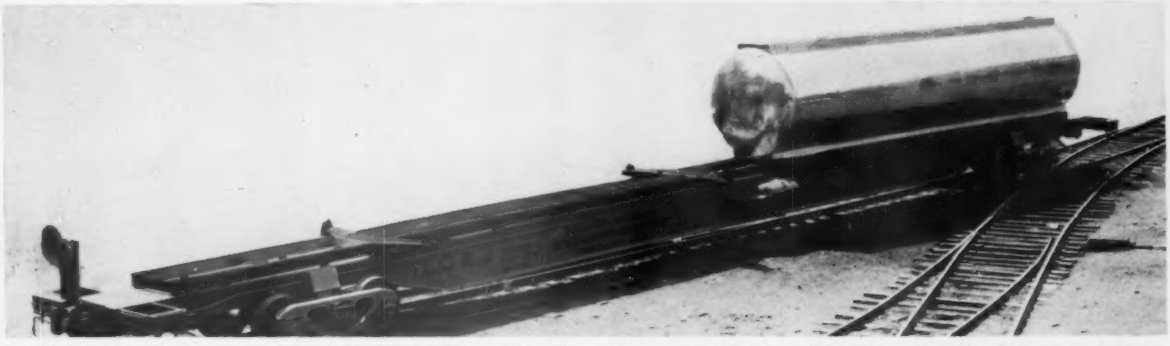
Vinyl coated duck covers spring-upholstered seats. Plastic walls are integrally colored.



Lightweight trucks have inboard bearings; air and coil spring suspension; two 100-hp motors.



Lo-Deck 87-ft piggyback car with deck only 31 in. above rail is said to end clearance problems with 13-ft 6-in. trailers and auto transports. Car's trucks have 28-in. wheels, Wabcopac brake units with Cobra shoes, and Timken 6- x 11-in. bearings. Light weight is 49,000 lb; capacity, 130,000 lb, and load limit, 179,000 lb. New Pullman-Standard trailer hitch is used.



Hydroframe-60 "skeleton" car is fitted with container cradle cushioned by a long-travel (60-in.) hydraulic device placed between the center-sill members. Designed soley for container transportation, the car is carrying a Trailmobile bulk liquid carrier made of extruded aluminum. Pullman also has Protectoframe-20, a cushioned cradle for application to existing flats.

P-S Introduces New Cars

Tools for coordinated transportation between railroads and the trucking industry are available from Pullman and were demonstrated at last month's AAR Mechanical Division meeting. Pullman-Standard showed cars designed for piggyback and container service. The P-S Hydroframe 60 has been applied to a container car and also to a conventional box car. Long-travel hydraulic cylinder has metering orifice in piston through which a metering pin passes. Device has movable cylinder head and is enclosed in a coil return spring.

Hydroframe-60 box car with cushioning device having 60-in travel—30 in. in either direction—is being tested by Western Pacific following San Francisco exhibit. Southern has ordered 200 P-S box cars with 30-in. cushions. With the 60-in. underframe, it is unnecessary to have load dividers or other securements, according to P-S engineers. Ultimate capacity approaches 1,000,000 ft-lb.

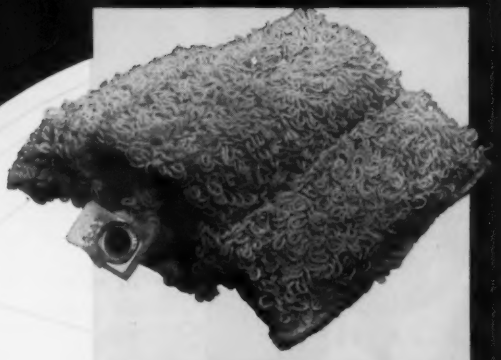
CENTRA-FEED

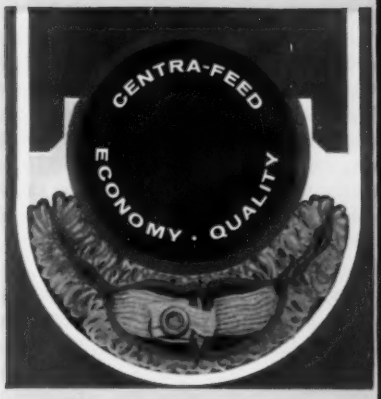
THE LUBRICATOR PAD WITH THE EXTRA WICKING ACTION

ECONOMY

The Newest Most Effective Journal Lubricator Pad With New Direct-Center Feed Wicking Action

QUALITY





CENTRA-FEED has constant wicking action — in — around — and through — CENTER and sides of middle two sections as well as around the two end sections — giving continuous filtered oil supply. Its new and novel Lock-Loop Construction is not a tufted fabric but a true weave. This feature provides positive pull-out proof pile and serves as an endless pipe line of oil.

Freight Cars equipped with CENTRA-FEED Lubricators means less maintenance, longer life, easy reclamation, many more trouble-free miles.

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2. **The Pull Strap** — Tough far beyond the necessary requirements.
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5. **No Pull-Out!** CENTRA-FEED'S new and novel Lock-Loop feature is recognized for its outstanding cover construction.
6. **CENTRA-FEED** has been A.A.R. tested and more than meets all requirements and current specifications.
7. **The outrigger sections** of CENTRA-FEED act as stabilizers, give extra wicking, function as filter agents and as added oil reservoirs.

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ELECTRICAL SECTION

From SP Vice President . . .

Challenges for Electrical Men

Four problems for which electrical men must be seeking solutions were discussed last month by W. D. Lamprecht, new vice-president (operations) of the Southern Pacific. The eighth annual meeting of the AAR Electrical Section in San Francisco heard Mr. Lamprecht pay tribute to accomplishments in the electrical field, and then call for developments which can improve the reliability of present day railroad operations.

"Electrical specialists and suppliers have in large part been responsible for the virtual revolution that has taken place in the technical phases of our industry," Mr. Lamprecht said. "Your efforts in finding new applications of electricity and electronics to railroading have made possible a tremendous improvement in efficiency and in the services we are able to offer. These contributions have been vitally important as an offset to steadily rising costs and intensified competition.

"Without in any way intending to disparage all you have accomplished, I want to point up some of the opportunities you have to do your job even better. . . . In maintaining on-time performance, motive power reliability is absolutely essential. . . . Much still remains to be done to cut down the frequency of locomotive failures. Out of 200 most recent diesel locomotive failures on the Southern Pacific, too many were caused by electrical difficulties. The great majority involved such basically simple things as a broken wire or a grounded circuit. . . . Some of these troubles undoubtedly came from inadequate design, others from lack of maintenance. With all the millions of miles of experience we have had with diesel electric locomotives, it seems we should be able to get rid of far more of these bugs. So, one of the principal problems facing you is to build a great deal more ruggedness into diesel electrical equipment.

"We also need to find ways of locating sources of trouble more quickly, so that, in more instances, repairs can be made without moving the locomotive into a terminal.

W. D. Lamprecht

"Another challenge is to find ways of simplifying the electrical controls and appurtenances on diesels . . . By now we should have found ways of designing units with fewer and less complicated parts, making them less expensive to purchase and more economical to maintain. The trend, however, seems to be in the opposite direction.

"I know that this simplification can be accomplished if we give it the attention it deserves. In modernizing one class of locomotives after three years of service, the Southern Pacific was able to eliminate about 15 relays and other electrical parts.

"Along with simplification goes the need for greater standardization of parts by individual builders and between builders to facilitate part replacements and to reduce inventory costs.

"In essence, what I've said about diesels applies also to passenger cars in connection with air conditioning, heating and lighting.

"These problems of making electrical equipment more failure proof, of finding ways to locate electrical trouble more quickly, and of striving for greater simplicity of design and standardization parts are challenges.

"The alternative, if you can't find the answer, may be a swing in the near future to mechanical or hydraulic drives . . . We will conduct performance tests of three diesel-hydraulic locomotives on the Southern Pacific next year, and I can tell you that a basic consideration in purchasing these units was the frequency of electrical failures on our present locomotives."

Eighth Electrical Section Meeting

J. J. Schmidt, chairman (right), is presented with gavel by G. C. Beck, RE&MSA president. Supply group sponsored exhibit of railway products.

Eighth annual meeting of the AAR Electrical Section in San Francisco last month was conducted by J. J. Schmidt, electrical research engineer, Denver & Rio Grande Western. At the closing session on June 16, P. B. Burley, superintendent communications and electrical engineer, Illinois Central, was elected chairman for 1961, succeeding Mr. Schmidt.

Exhibit conducted by Railway Electrical and Mechanical Supply Association placed special emphasis on products important to railroad electrical departments. Technical discussions also gave evidence of rapid progress in this field. A comprehensive report will be published in our August issue.

Standard 5-ft jumper can be used when two A units are in multiple.

Road switcher and road unit can be connected with standard jumper.

Jumper Receptacle on Nose Door

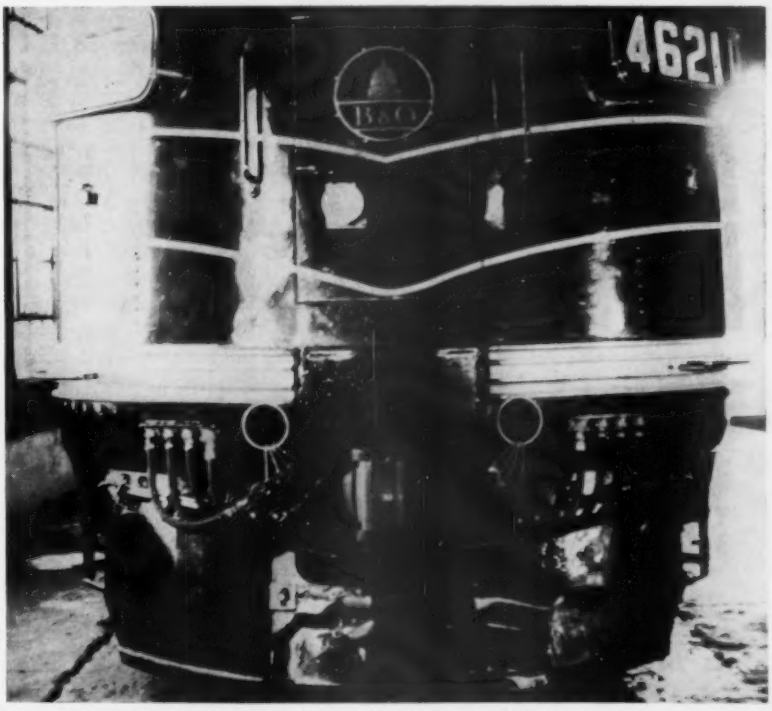
Location of the jumper receptacles on the nose ends of Baltimore & Ohio A units has been standardized in a new location. On most roads the A units have their front jumper receptacles high on the nose to one side of the nose door opening. The B&O has chosen to apply the receptacle directly on the nose door.

The installation of the receptacles has been part of a program to improve utilization of B&O diesels by making it possible to operate A units in multiple at any location in locomotive consists. The standard receptacle location, high on the nose, requires long jumper cables and is a location which is not easily reached.

The B&O installations can be reached by a man inside the nose compartment or standing on the ground. A standard 5-ft jumper cable can be used to m-u all types of road and road switcher units, except for the "nose to B-unit" connection which requires a 9-ft jumper.

Moulded cable is used between the door receptacle and the electrical locker on each A unit. Because the nose door must be taken off for some maintenance operations, such as main reservoir removal, the installation is designed so the control cable can be disconnected from the receptacle easily. By taking out four ¼-in. cap screws, the cable assembly can be removed from the door. The door, itself, can then be removed readily from the unit.

Adoption of the potential trainline system of dynamic brake control by the B&O makes it unnecessary to have a field loop jumper. All controls both for power and braking are now connected through the standard 27-pole receptacle.



Nose door mounting for jumper receptacle on Baltimore & Ohio A units has made possible standardization two on lengths of jumpers. It is easily reached from the ground.

A+dlake

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Aside from Adlake's hundreds of catalogued items for the railroad, look to Adlake for *made-to-order* products, too. Adlake has the facilities to extrude, cast, machine, and finish metals . . . fabricate products of glass, cloth, rubber, aluminum, copper, brass and steel. ALL under one roof, Adlake the SUPERMAKER is the industry's "supermarket" among suppliers.

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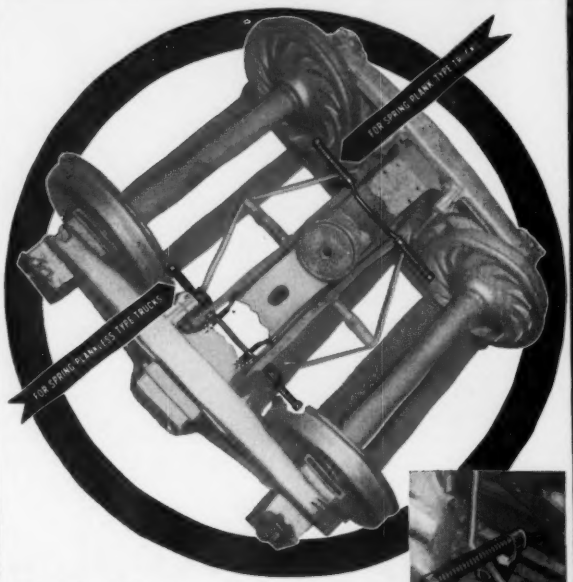
THE IMPROVED GRIPCO
BRAKE BEAM SAFETY SUPPORT



SPRING-PLANK TYPE

The Gripco Brake Beam Safety Support provides the greatest safety at lowest cost. Its dependability has been proven over years of actual service. Gripco Safety Supports are low in original cost, low in application cost and low in maintenance cost, even after years of service.

ENGINEERING IMPROVEMENTS

1. One design fits both 5'-6" and 5'-8" wheel base trucks.
2. One rod length and one spring length. One interchangeable casting fits both spring plank and spring plankless trucks.
3. Ideal for interchange repairs. New design permits easy and fast applications under all conditions. Nuts need not be removed to apply or remove the support.

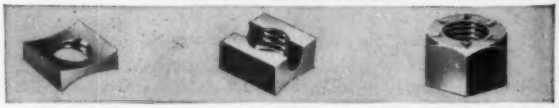
SPRING-PLANKLESS TYPE
(Safety Loops Included)

OUTSTANDING FEATURES

1. An inexpensive trouble-free support for Rebuilt Car Programs.
2. Designed for spring plank and spring plankless trucks. Spring plankless trucks require safety loops which can be bolted, riveted or welded to the bolster.
3. Supports the brake beam in the event of brake beam or hanger failure.
4. Holds brake beam in horizontal position.
5. Holds brake shoe in proper position in relation to the periphery of the wheel.
6. The brake release feature pulls brake shoes away from wheel contact instantly when brakes are released.
7. Prevents unnecessary wheel and shoe wear caused by dragging brake shoes.
8. GRIPCO supports can be removed and reapplied without removing nuts; therefore nuts are furnished in proper position.
9. Brake beams, rods, and levers are held in position under spring tension thus reducing false movements, chattering and wear of hangers, hanger pins and brake heads.
10. Can replace as a billable repair any support except A.A.R. recommended practice (angle-riveted and welded).

A.A.R. APPROVED—PATENTED AND PATENTS PENDING

OTHER GRIP NUT PRODUCTS AD NO. 110



Grip Lock Nut #1 | Grip Holding Nut #2 | Railroad Gripco Lock Nut #3

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Serving American Railroads Since 1904

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Doc and Bill Consider the SD-24

By Gordon Taylor

Some time ago, diesel electrician Bill Sparks called on Doc Watts at the Centerville diesel shop to learn about the all-electric controls used on EMD units, such as on the 1,800-hp GP-18 (RL&C, Feb. 1960, p. 45). The visit had been very helpful. When he heard that Doc Watts would be spending a couple of days on the Hill Division, Sparks decided to find out about the EMD Special Duty Diesel Model SD-24. SD-24 units were soon to handle Hill Division trains. Each unit is powered by a 2,400-hp engine and has six heavy duty traction motors. Usually these motors are geared for a top speed of 65 mph.

There were many things Sparks wanted to know—where did they get so much horsepower and how were the traction motors connected for the various steps of transition? Sparks lost no time in seeing Doc Watts.

"What's bothering you now?" asked Doc.

"Nothing bothers me," replied Sparks, "but I have found the best way to learn is to ask questions. I want to learn something about the new SD-24 unit with the 2,400-hp engine. How does it get so much power?"

"Well," replied Doc, "this is a 16-cylinder model 567D3 engine with a turbocharger. This turbine-driven supercharger takes the place of the Roots blowers used on other EMD engines."

"What do they need that for?" asked Sparks. "Why not use the regular engine blower?"

"You see," said Doc, "if you want more horsepower from a set of cylinders, you must burn more fuel. To burn more fuel, the engine cylinders must receive more air to support combustion of that fuel. The turbocharger can pack more air into the cylinders than was possible with the conventional engine blowers. Our Alco road units all have turbochargers. The turbocharger is a turbine-driven, rotary type air compressor and is powered by exhaust gases from the engine."

"How can a turbine, driven by exhaust gas from the engine, provide much air to the engine cylinders when the engine is being started?"

"The engine builder arranged this turbocharger so that during engine starting or during operation at the lower throttle positions, the turbocharger is gear driven directly from the diesel engine. This provides combustion air during the period when the engine exhaust gases don't have enough energy to drive the turbine and compressor at the necessary speed. When the engine reaches about two thirds of rated power, an over-running clutch disengages the turbocharger from its engine drive. It then becomes a 'free wheeler' and the exhaust gas has enough energy to drive the turbine unit."

"That's all very interesting," said Sparks, "but there doesn't seem to be anything electrical about this turbocharger, so let's talk about electrical equipment."

"But there are some electrical items involved with the turbocharger," said Doc, "and it would be well for you to know about them. They include a motor-driven pump to circulate oil to the turbocharger, a TLPC turbine lube-oil pump contactor, and a TLTD turbine lube-oil time delay relay. With the engine stopped, but with the main battery switch closed, the motor-driven pump starts running to circulate oil to the turbocharger. It starts automatically, runs for a timed period, and then stops. After engine and turbocharger have stopped, pump operates for a time to cool turbo-charger.

"With engine stopped, the no a-c voltage relay NVR will drop out. Its E-F contacts close to energize circuits to the turbine lube-oil time delay, TLTD, and the turbine lube-oil pump contactor, TLPC. As the TLPC coil is energized, its contacts A-B and C-D close the circuit leading to the pump motor. This allows current to flow from the storage battery through the main battery switch and the 15-amp turbine lube-oil pump circuit breaker to operate the pump motor. During this, the normally closed contacts of TLTD are being timed by this relay. About 15 min after being energized, these contacts open, breaking the circuit to TLPC, which in turn, opens the circuit to the motor, stopping the pump.

"This should give you an idea of the operation of the turbocharger, so we can take up your next question, Sparks. What is it?"

"What I want to know," said Sparks, "is how the transistion control system works. How do you connect six traction motors to start the locomotive, and how then are transitions made."

Starting from standstill," Doc explained, "the traction motors are connected in two groups of three motors in series, across the main generator. The two groups of series circuits are connected in parallel. This is accomplished by closing of all series power contactors—S14 and S45 connect motors 1, 4 and 5 in a series circuit; contactors S23 and S36 connect motors 2, 3 and 6 in another series circuit.

"From this basic circuit for the two groups of three motors there are five steps of forward transition. This is accomplished by closing traction-motor field-shunting contactors FS1, FS2, FS3, FS4 and FS5. Starting with full field, these steps occur in sequence to reduce the excitation.

"After completion of those transition steps, the next one involves a change of the basic circuit to another series-parallel hookup. In this step, the motors are connected in three groups of two motors each with the two motors in each group conected in series. The three groups are then connected in parallel across the main generator. From this basic circuit, six stages of traction-field shunting can occur. These start from full field, then FS1, FS2, FS3, FS4, FS5, and FS6 close, shunting the field in steps.

The next and last change in this basic circuit then occurs. The circuit changes from series-parallel to full parallel. To accomplish this, power contactors P1, P4, SP4, P2, P5, SP3, P3 and P6 will be closed, connecting the six traction motors in parallel across the main generator. This circuit change is then followed by two steps of shunting FS1 and FS2.

"Backward transition which occurs as the locomotive slows down results in motor circuit changes from full parallel through the two series parallel steps. All transition steps, both forward and backward, are initiated by

two relays FTR and BTR. These relays are connected to the high-voltage circuit to sense main generator output voltage and current. They keep their fingers on the pulse of the main generator and order appropriate control circuit changes to meet the load conditions at any given moment. They function in the same way as do the FTR and BTR relays on four-motor units.

"A forward transition step is initiated by BTR and FTR pickup, while backward transition is initiated by BTR and FTR drop out. Normal locomotive operation is with BTR picked up, except for a low-voltage series full-field position.

"That's an outline of the basic traction-motor connections, but you should look one of these units over to see and appreciate all of the changes that have been made. Make a point of being around when one of them is in the shop for inspection. Then you can see that the builder has made major changes. There are so many things to learn about these new units.

"For example, you have been used to single-step motor field shunting contactors. The SD24 units have a total of six field shunting steps for each motor. For the motors on the front truck (motors 1, 2 and 3) the field shunting contactors are FS1A, FS2A, FS3A, FS4A, FS5A, and FS6A. For the motors on the rear truck (motors 4, 5 and 6), the field shunting contactors are FS1B, FS2B, FS3B, FS4B, FS5B, and FS6B.

"I think we had better wrap up this session for the present. It becomes difficult to explain something like this without the opportunity of actually seeing it. I must say, Sparks, that your desire to learn about the new locomotives is very commendable. It is too bad there are not more men like you. You remind me of Noah. You see, it wasn't raining when Noah built the Ark. Like Noah, you want to be ready for the future."

"Thanks," said Sparks, "I will be back with more questions when I see one of these SD-24's."

Ventilating System for Covered Hoppers

Regulator and battery are carried at A end.

Safety generator is mounted atop center sill.

Applications of electrically powered ventilating systems and generating equipment to four Airslide cars leased by the Russell Hunter Milling Co. have been solving moisture problems associated with the movement of flour in covered hoppers. A year's operation of these cars has shown that constant circulation of filtered air through the load space keeps the car interior and lading dry and free of mold and odors. Cars have been moved through extremes of temperature and humidity without "sweating." Elimination of moisture simplifies unloading and cleaning, and extends the life of the car lining material. The ventilating installations were designed by Filt-R-Aire Ventilator Systems of Minneapolis, Minn.

The Filt-R-Aire installation includes a ventilated hood at each end of the car. The intake hood is equipped with a storm baffle and with a Farr dry, permanent type aluminum filter. On the opposite end of the car is the exhaust hood which has a 10-in. Safety coaxial fan that pulls 550 cfm of air through car continuously. Each of the hoods is fitted with a damper arrangement which also serves to divert the air stream so it flows along the sides of the car.

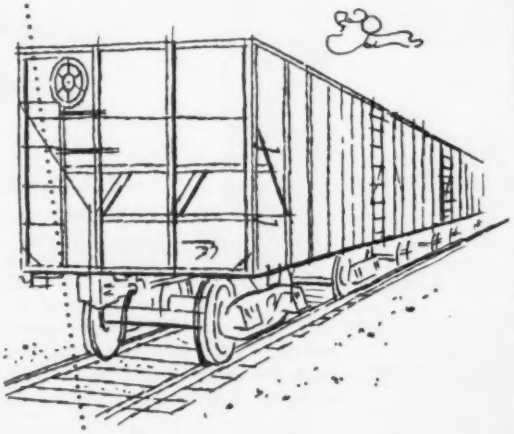
The cars have 12-volt electrical systems and have been fitted with 300-amp hr Edison batteries. The fan draws 3 amp and the iron alkaline battery has been able to operate the fan on a standing car for over four days. Because the battery is a full cycling unit, it will take a full charge after it has been completely discharged. The battery box is mounted just back of the end sill at the A end of the car.

Two types of generating systems have been used. In one, A Safety 1-kw caboose-type generator is driven by a Dayton endless cog-type V-belt drive. A 19-in. axle-mounted pulley is used, and the generator is mounted on the center sill at the A end of the car. A standard Safety 12-volt generator regulator is installed in a cabinet under the sloping floor at the A end.

The second type of generator which has been applied to Airslide cars is a Leece-Neville 660-watt alternator rectifier unit powered by a Preco friction drive running on the tread of the wheel. The drive unit is the same type as that used on refrigerator cars. The Leece-Neville alternator is mounted on the bolster at the A end of the car. Full charge rate is reached at 8.6 mph.

Designers of the ventilating equipment point out that a suction system should be used by the mill during loading to remove the air which delivers the flour into the car. During the first few hours of fan operation after the car is loaded, hot moist air is constantly expelled. When the car reaches the consignee, the fan should be stopped and both dampers closed to seal the car. Fans can be operated during empty return trips if the car is to travel through high humidity or temperature extremes.

CAR BUILDERS
RAILROADS
SUPPLY COMPANIES



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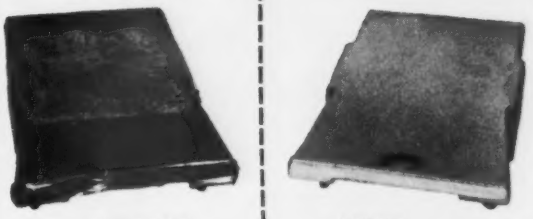

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- ☐ Lineman
- ☐ Wireman
- ☐ Fireman
- ☐ Engineer
- ☐ Draftsman
- ☐ Signal Maintainer
- ☐ Engineering Dept.
- ☐ Mechanical Dept. Office
- ☐ Official, Supervisor, Foreman, Chief Clerk
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Name_____

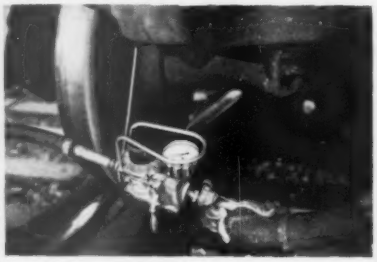
RR_____ Job_____

Address_____

City_____ Zone____ State_____

What's New

(Continued from page 10)

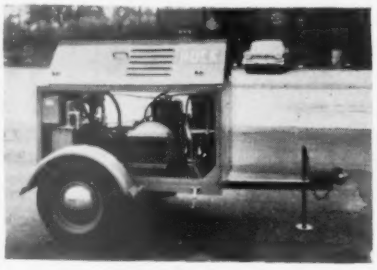


Brake Test Device

The Time-O-Test, developed on the Chesapeake & Ohio, is a compact unit designed to streamline brake-test operation. By operating a single handle on the device, the car inspector can charge the train through an unrestricted port, apply and release brakes through the proper size orifices, and lap the brakes for leakage tests. A gage shows the trainline pressure in all handle positions.

Before walking the train, the inspector sets a self-powered clock mechanism on the device to allow sufficient time for a brake application inspection. Release automatically takes place after the inspector has reached the rear of the train. On his return walk, he checks for proper release.

Principal advantage of the device is said to be its potential for streamlining yard test procedure by eliminating the delay often associated with brake release. In a medium size yard, the unit, it is believed, can pay for itself in less than a month. *Railway Research, Inc., Dept. RLC, 3333 Chelsea Drive, Cleveland 16.*

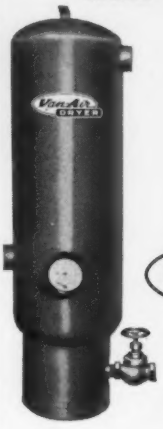


Transportable Hydraulic Power Unit

The Model 905G portable gasoline engine driven Powerig is transportable because of its integral two-wheel trailer. It was developed especially for operation of fastener installation tools in such field operations as equipment repair and rip track work where pneumatic or electrical power is not readily available.

The unit will operate all existing Huck hydraulic installation tools. It delivers hydraulic power at operating pressures up to 5,000 psi and can be used for installing the full range of Huck fasteners, including the ¾-in. diameter mild steel Huckbolt fasten-

NOW any Locomotive can be equipped to deliver DRY and NON-Corrosive Air throughout Train Lines and Brake System



PATS. PEND.

Van-Air® DRYER

When equipped with a VAN-AIR DRYER, any locomotive can deliver dry, purified compressed air throughout the train lines—and thereby prevent corrosion and freezing of air equipment and brakes.

The VAN-AIR DRYER *not only* extracts condensed water from compressed air (which stops freezing of air lines during winter temperatures) —*much more important* it intercepts residual vapors, acid fumes and microscopic solids which flow downstream from reservoir. By reducing these elusive elements the Dryer prevents the incessant corrosion or varnishing of internal metal surfaces exposed to the flow of air.

The VAN-AIR needs little space, is automatic, requires no heat or power—never needs regeneration. It delivers air dry, pure, non-toxic—and operates at the very nominal cost of

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ENGINEERS! Look into the sizeable savings in maintenance costs and parts replacements now practicable with Van-conditioned air. Ask for brochure which explains the economical Van-Air method—tested, proven and used in many hundreds of industrial applications.

ALSO for YARDS, SHOPS, BRAKE TESTING, etc.

Built in 35 capacities there is a Van-Air Dryer properly rated to treat any volume of compressor output—from total air for largest yard or shop operation down to minimal air for brake testing, remote tools, spraying units, etc. Ask for details.

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5787 SWANVILLE ROAD, ERIE, PA.

er. The electric starting system is 12-volt battery operated. *Huck Manufacturing Co., Dept. RLC, 2480 Bellevue ave., Detroit 7, Mich.*

Preformed Wire Rope Slings

The Hi-Pli series of Acco preformed cable-laid slings consists of a combination of a specified number of individual wire ropes (not strands) laid around a steel center core. The slings are said to be so flexible that knots can be tied into them without harm. A galvanized Galacco finish provides resistance to corrosion. Ropes can be had in 12 diameters—from 9/32 to 2 in. Breaking strength ranges from 3 to 113 tons. *American Chain & Cable Co., Dept. RLC, 929 Connecticut ave., Bridgeport 2, Conn.*

Urethane Foam Dust Guard

The Stanfoam journal-box dust guard, made from a special formulation of polyurethane foam, is said to have outstanding resistance to high and low temperature ranges and to be chemically resistant to oils. Standard Plastics and the Reading cooperated in its development. Upwards of 300 are in service on several railroads including the Reading which has equipped MU commuter cars and freight cars with the guard. Results to date are said to be completely satisfactory.

The Stanfoam design is said to provide an extremely tough and flexible dust guard which maintains intimate contact with the

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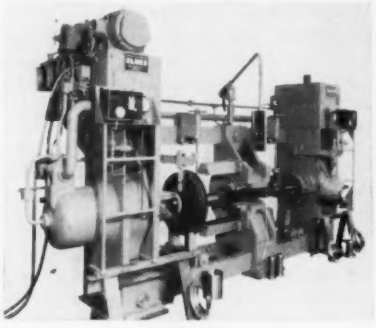
Toronto, Tulsa

journal. It is fabricated from two 1-in. pieces of foam, welded together by an exclusive electronic process that converts half of the foam into a tough skin that gives the guard high abrasive resistance and longer wearing qualities, and seals the journal from dust. It also minimizes oil spillage through the dust guard seal of the journal box.

Recent tests by the Reading and Standard Plastics show that the foam guard resists temperatures in the range of 390 deg F and minus 50 deg F and remains resilient to give a tight fit around the axle. The guard moves with the motion of the axle and flexes with it. A tight fit is insured because the inside diameter of the guard is smaller than the outside diameter of the dust guard land of the axle. At present, the guard is available only in one size—5½ x 10 in. *Standard Plastics, Inc., Dept. RLC, Fogelsville, Pa.*



Double-End Press

A 400-ton hydraulic double-end forcing press provides high-speed operation for mounting and demounting railroad car wheels, gears and gear boxes. It is push-button controlled. Each of its two rams has a capacity of 400 tons. Ram-to-ram opening is 125 in., and the distance between bars 54 in. The press provides a forcing speed of 27 in. per min., advance speed of 295 in. per min, and return speed of 400 in. per min. The press has two Ashton recording pressure gages, two push-button operated work support trucks, and two axle lift support hooks. Approximate weight is 35 tons. *Elmes-King Div. of American Steel Foundries, Dept. RLC, Cincinnati, Ohio.*

Self-Sealing Coupling

The 3750 Saf-Loc Self-sealing coupling, for use in aircraft fuel, oil, low-pressure hydraulic, pneumatic, and other systems, is especially designed to provide fast, safe connections where positive, foolproof locking is mandatory. The couplings connect and disconnect with a single, one-hand movement. While the positive thread action of the nut permits connection against line pressures ranging up to 60 psi, the coupling, it is said, will not disconnect accidentally even under the forces applied in operation up to 20 G's. *Aeroquip Corp., Dept. RLC, Jackson, Mich.*

Personal Mention

(Continued from page 8)

Tex.: J. D. HOPE appointed road master mechanic, succeeding S. P. BYRNES, retired.

New York Central. — *Collinwood, Ohio.:* ALBERT L. SIMONS appointed production control supervisor. Formerly process engineer at Detroit. MAURICE J. CHANDLER, assistant general foreman, appointed general foreman. *West Detroit, Mich.:* R. E. HUGHES appointed general foreman, car shops.

Norfolk & Western. — *Portsmouth, Ohio.:* EMORY C. CROWDER, JR., appointed general foreman, succeeding WALTER E. PIERCE, retired. *Columbus, Ohio:* VERNON L. MINNICK appointed general foreman, succeeding Mr. Crowder. *Roanoke, Va.:* DONALD S. HAGA appointed general foreman, Shaffers Crossing. ALBERT J. GRAHAM, JR., appointed personnel assistant—mechanical, succeeding Mr. Haga. JOSEPH R. ALTIZER appointed assistant enginehouse foreman, succeeding Mr. Graham. THOMAS C. MOORE appointed mechanical inspector to succeed Mr. Altizer. HERMAN J. ALTIZER, JR., assistant engineer of tests, appointed mechanical inspector, succeeding Mr. Moore.

Reading.—E. PAUL GANGEWERE, vice president—operations and maintenance, elected president. From January 1942 to March 1949 Mr. Gangewere was superintendent of motive power and rolling stock.

Santa Fe.—*Bakersfield, Cal.:* E. C. STOTLER appointed assistant supervisor of air brakes, succeeding J. D. JONES, retired. *Newton, Kan.:* W. F. TYE appointed assistant supervisor of air brakes, succeeding Mr. Stotler. Mr. Tye formerly road foreman of engines at Emporia, Kan.

Southern. — *Macon, Ga.:* THOMAS M. KEARNS, JR., appointed general foreman.

OBITUARY

C. C. Coult, who retired as mechanical engineer of the Lackawanna in January, died recently.

Supply Trade Notes

NORTH AMERICAN CAR CORP. — *Richard P. Herman,* manager refrigerator car division, appointed general sales manager.

■

WINE RAILWAY APPLIANCE DIV., UNIT CAST CORP.—*Robert G. Brassard* appointed sales manager at Toledo, Ohio. Mr. Brassard formerly with American Car & Foundry Div. of ACF Industries.

■

MAGNAFLUX CORPORATION.—Three new national sales positions established: *Kermit A. Skeie,* western region manager, Los Angeles, now in charge of Commercial

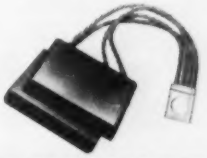
WANTED

DEAD OR ALIVE

Bar BURNING BRUSH

wanted for assault on commutators. Highly dangerous, with pyromaniac tendencies. Known to haunt diesel-electric locomotives in an effort to make contact with potential victims. *Beware!* Suspect is emotionally unstable and armed with substance that pits and burns coppers.

When captured, suspect should be remanded to custody of Stackpole Carbon Company, St. Marys, Pa. If proved guilty, Stackpole brush specialists will make prompt recommendations for adopting well-bred brushes that give longest life consistent with burn-free commutation.

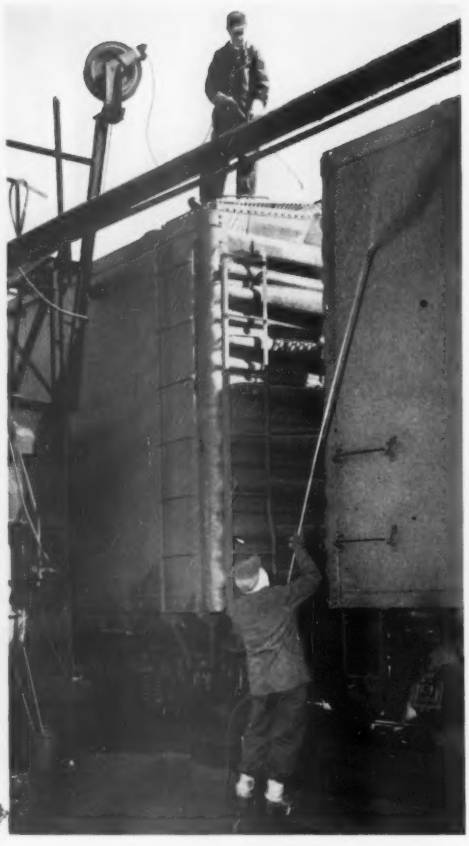


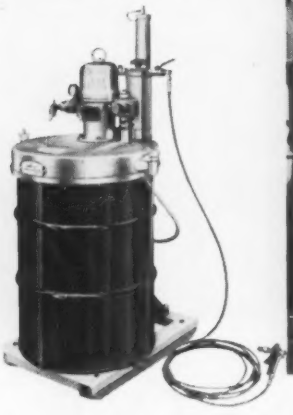
STACKPOLE *diesel-electric* **BRUSHES**

keep diesels rolling p-r-o-f-i-t-a-b-l-y

electrical contacts • seal rings • welding & brazing tips • graphite bearings
electrochemical anodes • voltage regulator discs • electrical & electronic components
rocket nozzles

Here's How HYDRA-SPRAY Saves Money for the ILLINOIS CENTRAL RAILROAD



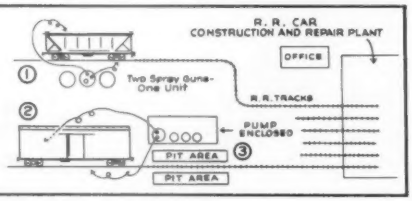


Graco Hydra-Spray is really doing the job for the Illinois Central Railroad. In their Construction and Repair Plant at Centralia, Ill., three 55 gallon stationary Hydra-Spray units have been in operation about a year and have proved to be big money savers over previously used equipment.

Workmen like the lightweight Graco Equipment and the easy one coat coverage it makes possible . . . They work easier and faster. Another saving results from almost complete elimination of overspray and bounce back. These savings are possible even though *all work is done outside.* Illinois Central, for example *now uses 10 gallons of paint where 13 were previously used.*

What's more, these are just some of the many benefits of Hydra-Spray. Graco's Railway Representative will be glad to explain much more about both the equipment and the engineering service. Write or call . . . today.

1. Two Spray Guns—One Unit.
2. Both Sides of Car Sprayed at One Time.
3. Another Spray Gun Used in Pits to Spray Under Parts.



GRACO RAILWAY DEPARTMENT

GRAY COMPANY, INC. • *Engineers and Manufacturers*
782 Graco Square, Minneapolis 13, Minnesota

Factory Branches:
NEW YORK—34-35 11th St., Long Island City
PHILADELPHIA—3489 Ridge Ave.
DETROIT—2699 W. Grand Blvd.
CHICAGO—1134 South Michigan
ATLANTA—1223 Spring St. N. W.
SAN FRANCISCO—141 11th Street
HOUSTON—1913 Leeland Avenue

Sales Office: WASHINGTON, D. C.—2902 Porter Street, N. W.

Inspection, with headquarters at Chicago. *Denis P. Walsh,* midwest region manager at Chicago, now manager of distributor and representative sales. *Robert G. Strother,* eastern region manager, New York, now in charge of field engineering, with headquarters in Chicago. Posts of regional managers abolished. *Richard Turner* appointed Los Angeles, Cal., branch manager, and *Henry Bogart,* New York branch manager.

■

BENDIX CORP. — Company formerly known as the *Bendix Aviation Corp.*

■

CLINE TRUCK CO.—*Harry R. Bartell & Associates, Inc.,* St. Louis, Mo., appointed to represent Cline railroad trucks.

■

AMERICAN STEEL FOUNDRIES.—The East Chicago, Ind., Harbor plant, recently converted from sand molding to a shell-molding process called Amer-Shell, is producing brake beams, knuckles, and friction shoes for ASF ride control trucks and other steel castings weighing up to 300 lb.

■

W. H. MINER, INC.—*William D. Wallace* appointed to newly created position of vice-president engineering and research.

■

CHICAGO MALLEABLE CASTINGS CO.—*Robert C. Geekie* appointed southwestern and St. Louis representative.

■

ALCO PRODUCTS, INC.—A new $500,000 production center for cold-wound springs opened at Chicago Heights, Ill. Facility housed in an 18,000 sq ft addition to Chicago Heights plant.

■

OAKITE PRODUCTS, INC.—*Daniel B. Lamb* appointed Detroit division manager, succeeding *Thomas R. Smith,* retired. Mr. Lamb formerly in Kokomo, Ind., area.

■

GENERAL STEEL CASTINGS CORP.—General Steel Castings has acquired the *St. Louis Car Co.*

■

STRAN-STEEL CORP., DIVISION OF NATIONAL STEEL CORP.—*J. G. Skaaren* appointed assistant to the president. *F. E. Daggett* appointed general sales manager, succeeding Mr. Skaaren.

■

CONSOLIDATED MACHINE TOOL DIV., FARREL-BIRMINGHAM CO. — *Robert R. Miller* appointed manager, railroad tool sales, with headquarters in Rochester, N. Y. Mr. Miller formerly western sales representative at Long Beach, Cal.

■

AMERICAN BRAKE SHOE CO.—*Calvin E. Smith* appointed district sales manager, Railroad Products Division, in southwest area. Headquarters, Houston, Tex. Mr. Smith formerly sales representative for the division.

■

OWATONNA TOOL CO. — *Francis J. Pauler* appointed industrial sales engineer.

■

FAIRBANKS, MORSE & CO. — *H. E. Hanson* appointed vice-president and general manager of Beloit, Wis., division. *Ervin L. Dahlund* appointed general man-

ager of D.C.L. Group (diesel engines, compressors and locomotives). Mr. Dahlund formerly director of engineering, Albuquerque division, ACF Industries, Inc.

■

UNITED SPECIALTIES, INC.— Following appointed manufacturers' representatives: *Nicholson Products Co.*, Clifton, N. J.; *Craig Industrial Equipment Co.*, Memphis, Tenn.; *Industrial Engineering Sales Co.*, Chicago, and *W. J. Bernhart Co.*, Buffalo, N. Y.

■

SAMUEL MOORE & CO.—The *DeVilbiss Co.*, Toledo; *Binks Mfg. Co.*, Chicago, and *Gray Co.*, Minneapolis, appointed national distributors for Synflex Universal paint spray hose.

■

ELECTRIC STORAGE BATTERY CO.— *C. J. Moore*, general sales and marketing manager, Exide Industrial Division, appointed vice-president marketing of the division.

■

DIESEL INJECTION SALES & SERVICE, INC.—Construction begun on $250,000 headquarters plant and office at Norfolk, Va.

■

METALWELD, INC. — *S. John Oechsle, Jr.*, named president, succeeding *S. John Oechsle, Sr.*, now chairman of the board.

■

CURTISS-WRIGHT CORP. — *Current Controls Corp.* of Chicago appointed railroad sales representatives of Princeton Division of Curtiss-Wright on nationwide basis.

■

LUMINATOR, INC.—*Walter F. Gips, Jr.*, elected president.

HELPS FROM MANUFACTURERS

The following compilation of literature — including pamphlets and data sheets—is offered free to railroad men by manufacturers to the railroad industry. To receive the desired information write direct to the manufacturer.

CAR LOADING SYSTEM. Technical booklet SR-2 of detail designs, discusses loading and unloading techniques and flexibility of the Sparton Easy Loader (SEL) adjustable freight-car loading system. (Write: *Sparton Railway Equipment Div., Dept. RLC, 17333 Healy ave., Detroit 12, Mich.)*

ULTRASONIC CLEANING. 4-page folder describes how ultrasonic cleaning combines high frequency sound waves with special chemical solutions to produce cleaner parts faster than with manual or mechanical cleaning methods. Also illustrates and describes new Turco line of ultrasonic equipment and compatible cleaning compounds. (Write: *Turco Products, Inc., Dept. RLC, 24600 S. Main st., Wilmington, Cal.)*

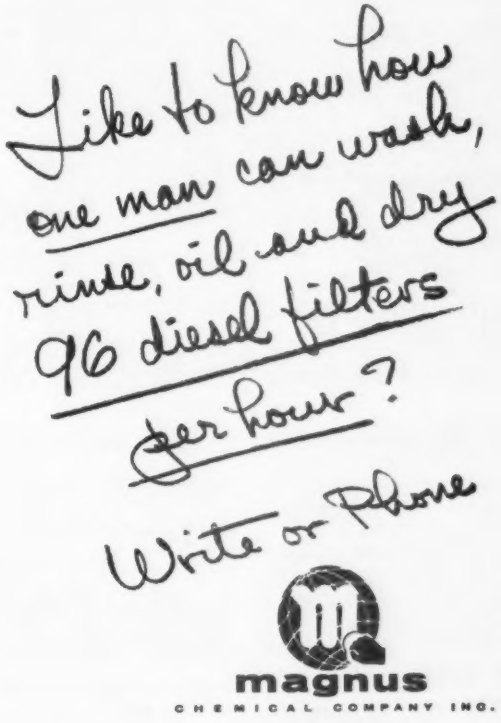
FREIGHT-CAR ROOF. Folder describes how MacGregor folding sectional roof works and how railroads can profit from its use. (Write: *Railway Supply & Equipment, Inc., Dept. RLC, Clarks Summit, Pa.)*

CLEANING PRODUCTS. 11- x 17-in. folder style quarterly, "Shop Talk from Wyandotte," introduced for railroad purchasers, shop foreman, etc. Describes uses and applications of company's cleaning products for diesel engine cleaning, car washing and cleaning, parts and truck cleaning and other equipment cleaning and paint stripping operations. (Write: *Wyandotte Chemicals Corp., J. B. Ford Div., Railroad Sales Dept., Dept. RLC, Wyandotte, Mich.)*

AXLE JOURNAL ROLLER BEARING MAINTENANCE. — Bulletin No. RR-0 describes and illustrates line of new axle journal roller-bearing maintenance and lubrication equipment approved by Timken and Hyatt. (Write: *Owatonna Tool Co., Dept. RLC, 660 Cedar st., Owatonna, Minn.)*

PRESSURE TREATED WOOD PRODUCTS. 12-page booklet is a condensed guide to the selection and use of car lumber, piling, etc. (Write: *Wood Preserving Div., Koppers Co., Dept. RLC, 750 Koppers Bldg., Pittsburgh 19.)*

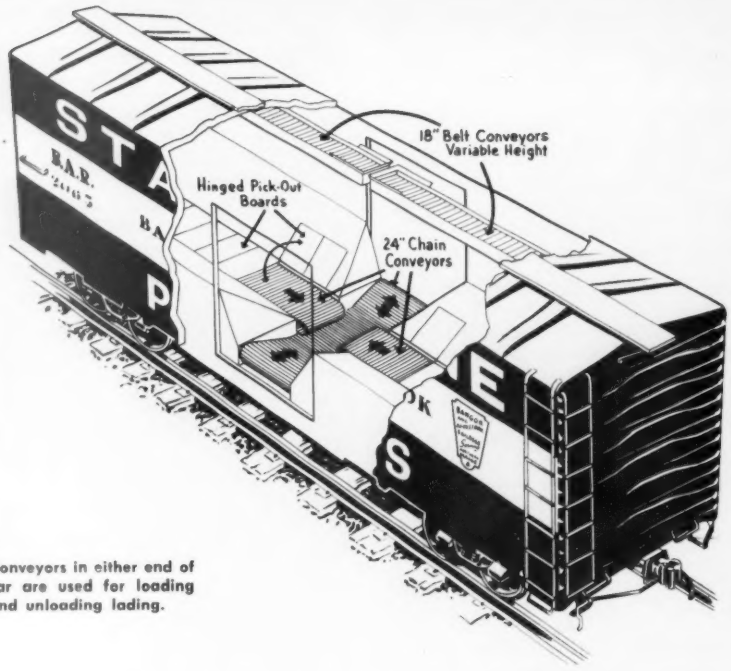
SPOT CAR REPAIR SYSTEM. 6-page bulletin details all main components of the R.M.C. spot car repair system. Includes schematic drawings of representative systems, as well as illustrations and data on components. (Write: *Railway Maintenance Corp., Dept. RLC, Box 1888, Pittsburgh 30.)*



RAILROAD DIVISION
Garwood, N. J.
SUnset 9-0200

Potato Car Loads and Unloads Automatically

The Bangor & Aroostook has a new car for bulk produce it thinks may "revolutionize transportation" of potatoes, onions, oranges, and other round fruits and vegetables. The car—a standard blue, white and red insulated box car with an underslung heater—loads and unloads automatically. It has an inclined floor to make potatoes flow by gravity into unloading conveyors. Two conveyors, one in either end of the car, handle loading and are raised as the load builds up. In the first test, the car was loaded as quickly as potatoes left the packing house line and was unloaded in 25 min.



Conveyors in either end of car are used for loading and unloading lading.

The idea for the potato car, 50 of which the BAR is using in its own service, came from the increasing number of repacking operations for BAR potatoes. In the past, this has meant transfer from 100-lb bags to 10-lb polyethylene bags for the consumer, an expensive and sometimes damaging process for the shipper.

Pedrick

PISTON RINGS

for outstanding performance and long life in Diesel and Gas Engines, Pumps, Compressors

Write for New Descriptive Catalog

WILKENING MANUFACTURING CO.

Philadelphia 42 and Toronto 2

WANTED: Surplus or used, E.M.D. injector plunger & bushing assemblies #5227853, #5228236 .421 diameter, GM-DD Series 110 plunger & bushings and parts. Rail, 2093 East 19 Street, Cleveland 15, Ohio.

SALES ENGINEER

Well established firm in Midwest offers unusual opportunity to man with knowledge of railroad cars and equipment. Prefer previous sales experience in railroad field. Write, sending complete resume, photo and salary requirement — our employees know of this ad. Write Box 105, Railway Locomotives and Cars, 30 Church Street, New York 7, N. Y.

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Vapor Upgrader
hot hydraulic cleaners

DO THE DIRTY WORK

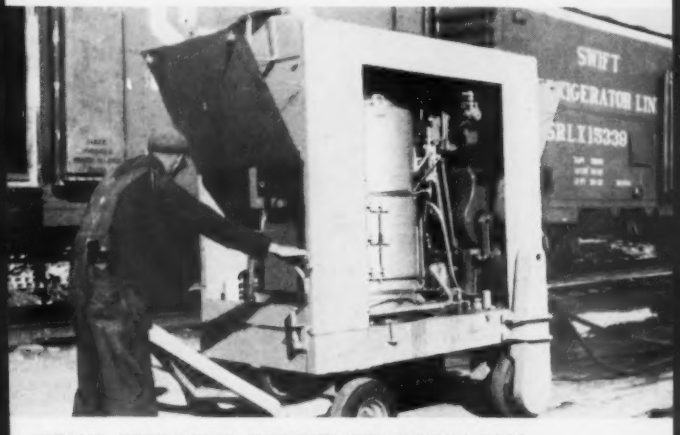
10 times faster
...with 80% saving in labor cost!

Cars and locomotives go back into service sooner when they're cleaned with Vapor Upgraders. Controlled stream of high-velocity hot water and steam softens, loosens, flushes away caked dirt, grease, frozen sludge, in minutes—from the smallest, most inaccessible crevices. Solvents or detergents can be added to the jet to remove the most stubborn grime and contamination.

Vapor Upgraders can be used for other jobs as well as car cleaning—to melt ice or packed snow; free frozen mechanisms, switches; thaw pipes; tunnel cleaning; paint stripping; bridge and structure cleaning; layover car heating; and dozens of other uses.

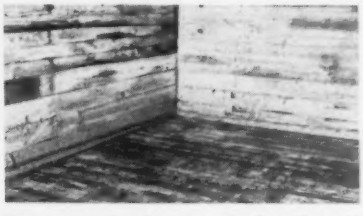
SIZES: Upgrader Senior—1500 gals. per hour of 180° water @ 250 psi., or Upgrader Intermediate—750 gals. per hour of 180° water @ 200 psi.

CLEANS DIESEL LOCOMOTIVES, PASSENGER COACHES
The Milwaukee Road uses a mobile Upgrader Senior to clean oil, grease, frozen sludge, and road dirt from underframes, tanks, brakes, etc. in compliance with Interstate Commerce Commission Rule Ex Parte 174.



CLEANS, DEODORIZES, DEVERMINIZES FREIGHT CARS
The Union Pacific uses Upgrader Senior for freight car cleaning. Self-propelled feature of this model saves money by eliminating need for tractor to move unit from car to car.

ONE MAN UPGRADES 30 CARS A DAY...FOR LESS THAN $1 PER CAR



One man upgrades a car in less than 15 minutes. High pressure jet blasts dirt and vermin out of corners and crevices no brush could ever reach. With detergents, cars are so thoroughly scrubbed that floor boards need not be removed even if car is to be used for hauling wheat or sugar. Neoprene and other sealants are not affected.

(Above): All traces of lime and cement washed away and no odor left. Car is now acceptable for hauling grain. Even hide cars can be upgraded with Vapor Hot Hydraulic Cleaning.

3-WHEEL TRAILER TYPE for frequent movement or towing considerable distance and over rough terrain. Front wheel folds up and locks for towing.

4-WHEEL PORTABLE TYPE for more limited movement, as in shops, etc. Also available with flanged wheels for movement on rails. Self-propelled models can be furnished.

SKID-MOUNTED TYPE with heavy curved-up channels and tow-bar for use where unit is seldom moved—as between shop interior and nearby trackside locations.

For detailed information write for Bulletin 4008

VAPOR HEATING CORPORATION

80 East Jackson Boulevard, Chicago 4, Illinois

Offices in Principal Cities

DOUBLE POWERED SYSTEM

COMPLETELY DESCALES DIESEL ENGINE COOLING SYSTEMS! IT'S SAFE, EASY!

That's right. Using only two dry products—Wyandotte RANTIER and A.E.—you can easily remove *all* the scale from your diesel engine cooling systems. Wyandotte A.E.—RANTIER DOUBLE-POWERED SYSTEM is safer and more effective than muriatic acid. More convenient, too. Requires no special handling—no carboys, no returnable drums. Saves you both time and money!

HERE'S HOW IT'S DONE:

RANTIER removes oily residues, softens scale, cleans out sludge and heavy soils.

A.E. *completely* dissolves scale, rust, and soils so that they can be easily flushed away. Gets radiator interiors and cooling water passages in heads and liners clean and scale-free. Eliminates neutralizing!

No special equipment needed! No dismantling . . . no special hook-ups.

COOLER ENGINES!

If you want cooler diesel engines, at minimum costs, call your Wyandotte cleaning specialist. He'll be glad to give you all the details about the new A.E.-RANTIER DOUBLE-POWERED SYSTEM. *Wyandotte Chemicals Corporation, Wyandotte, Michigan. Also Los Nietos, California; and Atlanta, Georgia. Offices in principal cities.*

RANTIER is an all-purpose, medium-duty alkaline product that's safe for use on both ferrous and non-ferrous metals. Cleans painted surfaces without damaging finishes.

A.E. is a mixture of acids and acid salts combined with synthetic detergents. Easy to control and use, A.E. has a low "free acid" content. Will also descale air-conditioning evaporators and condensers.

Wyandotte® Chemicals

J. B. FORD DIVISION

Specialists in railroad cleaning products